The Main Directions of Milk Production and its Processing Products Volume Increasing in the Russian Federation

M D Magomedov\textsuperscript{1,2}, O V Karabanova\textsuperscript{1,2}, V V Stroev\textsuperscript{1,2}, V V Moiseev\textsuperscript{1,2,*}

\textsuperscript{1}Moscow City University, 2nd Selskokhozyastvenny Pr., 4, Moscow, Russia, 129226
\textsuperscript{2}Belgorod State Technological University named after V.G.Shukhov, 46 Kostyukova St., Russia, Belgorod, 308012

E-mail*: din_prof@mail.ru

Abstract. The article presents the current state of milk production in the Russian Federation (RF). The reasons for its decline are identified. In a difficult economic situation, an important role policy of import substitution. The problems of import substitution become even more urgent in connection with the Western sanctions imposed against Russia in connection with the events in Ukraine. In this regard, there has been a decline in food imports from abroad and an increase in the growth rate of food production, oriented to the domestic market. The authors make a valid conclusion that an economically literate policy of import substitution in the agro-industrial complex and other sectors of the economy can become a catalyst for overcoming the technical gap, reviving the investment climate, and increasing its own production of food in necessary quantities in accordance with medical norms of consumption. The main directions of milk production volume increase and its processing products in the Russian Federation are presented. Each direction is considered separately and recommendations for its improvement are given. A new approach of commercial loan allocation for entrepreneurs engaged in milk production and its processing products is proposed.

1. Introduction
Food security governance is a priority for any state. At the beginning stage of the transition of the Russian Federation to free market economy there were serious problems with supplying of food and mainly the food was imported. The development of the agro-industrial complex (AIC) of the country was not given due attention. Over time, it became clear that the problem needs to be fixed in order to not depend on the changing world market conditions, and to use the released foreign exchange resources for other purposes. Starting from 2014, the development of the agro-industrial complex of Russia is running at faster rates. That became possible thank to improving financial support by the Government of the Russian Federation. The results came very soon. In recent years the export of agricultural products has increased significantly. In 2019 export revenue has amounted more than 24 billion US dollars.

2. Problem statement
However, nowadays there are still problems with providing the population with milk in the RF. Milk belongs to full-value food products of the population. It contains all the substances required for human life. In the year 2017 the volume of milk production in Russia has reached 30.2 million tons, while in
the year 2010 it was 31.5, that means decreasing by 1.3 million tons. The same time the yield of milk has increased to 4368 kg per cow in the year 2017, while it was only 2502 kg per cow in the year 2010. The number of cows has decreased: 8.0 million heads in 2017 and 8.7 million in 2010. In order to cover needs of the country 7.1 million tons of milk were imported in 2017, which is 23.5% of its domestic production. To minimize import of milk and to cover demands of the population with required volume of milk, it is necessary to increase its production.

3. Research questions
Basing on the results of the study it is proposed to be guided by the following main directions of increasing the production of milk and its processed products in Russia:

1. Selective breeding new highly productive cows;
2. Creating a feed base and feeding highly productive cows in accordance to zootechnical standards;
3. Providing the required conditions for cow keeping;
4. Reducing the incidence of highly productive cows;
5. Mechanization and automation the cowsheds cleaning, feeding and milking processes;
6. The prompt milk movement to the storage and its timely processing;
7. Realization of milk and dairy products.

4. Purpose of the study
The main purpose of the research is to analyze each direction of increasing the production of milk and its processed products in Russia.

5. Research methods
When studying the main issues of the topic, the author uses the following methods:

1) the method of comparative analysis was used by the authors to research the volume of feed harvesting in Russia, the prices for milk and dairy products in the retail network of Moscow;
2) a systematic method that allows to create a holistic view of directions of increasing the production of milk and its processed products in Russia.

6. Study discussion
The following should be noted.

1. Selective breeding new highly productive cows.
   In the modern context of Russian economy development significantly increases the importance of breeding milk producing farm animals and their productivity extending. This is due to the significant reduction of costs per kilogram of produced milk. The breeding works with agricultural animals are carried out primarily by selection. There are specific requirements to these activity: All selected animals should 1. be only highly productive; 2. trained for machine milking; 3. yielding much milk; 4. have good constitution; 5. be resistant to possible diseases; 6. be same by volume and speed of milk flow rate. After selection of animals, the breed selection work itself begins. In modern conditions, the main goal is to breed cows with maximum impacts with good fat content in milk. As it known, top performing cow can issue 7000 - 8000 kg milk a year. Achieving these results while simultaneously increasing such cow population will completely eliminate the problem with the milk provision of the households, and also give an opportunity of milk exporting.

2. Creating a feed base and feeding highly productive cows in accordance to zootechnical standards.
   In order to obtain a possible amount of milk from highly productive cows, a good feed base and appropriate feeding are needed. To fulfill these goals rough, succulent and concentrated feeds are used in feeding cows. The feed is to be of sufficient quantity and of high quality. Rather slight deviations from the required standards of cow feeding lead to milk beds decrease. The analysis showed that the quantity and quality of cow feed, in most cases, are capable of improvement. According to Rosstat
review (2019), the volume of feed harvesting amounted to: gross 23.6 million tons of feed units, including 12.9 million tons of hay, 8.8 million tons of haylage, 1.9 million tons of straw; succulent fodders - silage 5.7 million tons of fodder units. The total need for rough and succulent feed for 2019-2020 is 31.7 million centners of feed units, and the provision is at 29.3 million centners. That is, a deficit amounts 2.4 million centners. In such conditions, it is necessary to take quick measures to increase the quantity and the quality of rough and succulent feed in the Russian Federation. Concentrated feed is important in feeding highly productive cows. Before feeding cows, with the exception of mixed fodders, it is chaffed at special equipment for greater digestion. In advanced market economies, only mixed feed is used as concentrated feed. The reason is in mixed feed that is balanced in nutritional value and this results in the significantly higher cow productivity. Therefore, the use of grain in pure form should be completely excluded when feeding cows in the Russian Federation. According to Rosstat, the production of mixed feed in 2017 amounted to 27.4 million tons. This number of mixed feeders is not sufficient for growing needs. 45.3 million tons of grain were spent on feed purposes in 2017. With the full use of this amount of grain by processing into a combine farm, their volume will be 64.7 million tons (Taking into account the average specific weight of grain in the mixed feed of the Russian Federation - 70%). And if the share of grain in mixed feeders is brought to the level of the European Union countries (35%), their quantity will be - 129.4 million tons. The Russian Federation has such enormous reserves for increasing the volume of mixed feed production. It is necessary to do much to increase the volumes of non-dead ingredients to use them. It is possible if the food enterprises are interested in the treatment and sale of wastes of their production. Good feeding base availability is not sufficient to obtain large milk beds from highly productive cows. Cow feeding should be carried out in strict compliance with zootechnical rules, for example, feeding procedure. Cows should be served first by combine, after by succulent feed and by rough at the end of procedure.

3. Providing the required conditions for cow keeping.

The required conditions depend on a variety of factors (specialized accommodation; cow population; maintenance personnel; climate and environmental conditions of cows location; sufficient pasture; care and feeding by providing with special equipment for feeding and care). Depending on these factors, there are three systems for keeping cows: stall, grazing and combined.

The grazing system is used mainly for calf rearing. In large farms cows are kept in pastures and milking is carried out here in warm season. Stall system is used without grazing on pastures. It is practiced in areas where there is very little land for pasture.

The combined system is practiced in both large and small farms. The grazing of cows in pastures takes place during the day, and at night they are housed.

Determining the barn size, the following standards should be fulfilled: the area per 1 cow is 6 sq.m., together with the calf - 10, the height of the barn - 2.5 m. The ventilation and lighting systems should be appropriate.

4. Reducing the incidence of highly productive cows.

Over the last years agricultural enterprises of the Russian Federation have made mass purchases of high-yielding cows in the United States, Canada and European countries at very high prices. While using these cows, buyers face some problems such as: lack of desired growth of productivity of purchased cows, significantly small reproduction as well as significant rejection and slaughter of cows. The main reasons for cow disposal are diseases and disorders in feeding. These shortcomings need to be overcome promptly.

5. Mechanization and automation the cowsheds cleaning, feeding and milking processes.

Production processes mechanization and automation lead to lower costs mainly due to labour input reduction.

As mentioned above, the tie-up housing and yard housing in cow barns are used in practice as two methods, and the choice of the method affect the mechanization and automation of cow harvesting,
feeding and milking processes. The tie-up housing allows to mechanize water supply to the barn and motor feeding of cows, milking of cows, preparation of fodders and their distribution, manure cleaning. All barns are to be provided with hot and cold water. Cold water is supplied to the farm and then filters for water purification are installed. Motor wheels are used for livestock watering.

Cows are milked in stalls by portative electric milking machines with milk collection into special containers or into parlor pipeline. If the cows are kept free (yard housing), they are milked with special installations using group drinking bowls. Milk and milk delivery control are recorded by special measuring cylinders. Feeding with concentrated fodders is normalized due to feeders with dispensers.

In case of mechanized cow milking, primary milk processing is carried out to purify and to cool it. The fodder preparation mechanization allows to significantly reduce labor intensity of performed works. Mobile feed dispensers are used for distribution of fodders. Comfortable conditions of cow keeping are not only feeding them at the proper level, but also keeping cows clean. For this purpose, it is necessary to remove manure and other wastes occurring in the barn and quickly remove them to the manure storage facility in order to reduce unpleasant odors. Manure is cleaned by drag and reciprocating scrapers.

It is transported from the barn to the manure storage facility by means of trolleys, cars and pneumatic transportation.

6. The prompt milk movement to the storage and its timely processing.

Milk refers to perishable products and therefore its rapid transfer to storage facilities and timely processing is essential. Practice shows the transport of milk over long distances leads to the appearance of cream on the upper part of it due to the reduction of fat content in other layers. This impairs the quality of the milk. In order to prevent such negative phenomena, the distance of its transportation should be reduced as much as possible. In recent years, the construction of shops or dairy plants has been practiced directly in rural areas. This allows to significantly reduce the distance of milk transportation and accordingly reduce transport costs. In addition, it allows agricultural enterprises to move away from the monopoly of large dairy plants, as well as to reduce losses of milk transportation and to direct the waste of its processing to the feeding of cows. At the same time, it should be noted that the construction of such enterprises in agriculture reduces the seasonality of production and contributes to the increase of workplaces. The construction of such shops near the barns is applied in practice. In such cases milk from the milking plant is transferred along the milk duct to the processing shop and then supplied to the pasteurizer. It ensures high quality of milk and milk products, and reduces the cost of production. In addition to transportation, milk is cleaned from mechanical impurities, cooled and stored under appropriate conditions. In farms milk is cleaned by way of its transfusion from milking bucket into special reservoir through gauze filters.

An important place in the primary processing of milk is its cooling and storage. Fresh milk has a bactericidal property. The duration of its action depends on the temperature of the milk. The higher its temperature the lower its shelf life. Milk cooling tanks are used for cooling and temporary storage.

After primary treatment, milk is to be processed and dairy products produced. They can be produced in farms where milk processing workshops have been built or on independent milk plants. In each case, the business plan should be calculated and the final decision is to be taken.

7. Realization of milk and dairy products.

The final stage determining the final results of the economic activity of the agricultural enterprise producing milk is its distribution. Milk processing can be carried out, as mentioned above, by farms themselves or independently functioning milk plants.

There are special rules for milk and milk products sale.

Milk should be obtained from healthy cows. Agricultural enterprises should not allow such substances in milk as inhibitors, detergents and disinfectants, neutralizers, growth stimulants and medicines.

According to the current legislation, the sale of milk and products of its processing to the retail network is allowed if the sellers guarantee their compliance with safety requirements. Producer should
inform consumers about the name and list of ingredients of the product, its place of manufacture and expiry date. Moreover, in recent years, dairy producers, taking advantage of the lack of milk in the country, have used palm oil in the production on a mass basis, that has led to a deterioration of its quality. In this situation, a number of legislative measures to reduce palm oil consumption have been taken.

The situation with import substitution did not improve in 2015. This conclusion is confirmed in the report of the Accounts Chamber of the Russian Federation "On the Federal Budget for 2015 and for the Planning Period 2016 and 2017". In the section of the report devoted to problems in the agro-industrial complex, it was stated that the limited opportunities of Russian agrarians would not allow to replace products from the USA, Canada, the EU, Norway and Australia, against which Moscow imposed sanctions, in the nearest future. The biggest problems with import substitution arise with some types of meat and dairy products. The Accounting Chamber, referring to Rosstat’s data, reported that in 2013 the level of free production capacity in the meat processing industry was about 34%. In cheese production in 2013, the level of free capacity reached 41%, while 48% of the total volume of consumption by Russians of this product was imported [8]. The most noticeable gap in the dairy industry. However, it will be problematic to load even the available production capacities, as some products are produced using raw materials from countries for which counter-sanctions and a ban on imports to Russia have been introduced. It should be remembered that these restrictions on food imports were introduced by presidential decrees No. 560 of August 6, 2014, "On the Application of Certain Special Economic Measures to Ensure the Security of the Russian Federation" of November 28, 2015, No. 583, "On Measures to Ensure the National Security of the Russian Federation from Criminal and Other Illegal Actions and the Application of Special Economic Measures against the Republic of Turkey"[16,17].

The ban on import of foodstuffs in connection with the embargo became the most ambitious restriction on the import of agricultural products since the beginning of the implementation of the Russian policy on import substitution. The reduction in the volume of food imports in accordance with the imposed embargo orders is shown in the following table.

**Table 1. Reduction of food imports to Russia in accordance with international decrees*.**

| Indicators                  | Total import (tons) | Decrease of imports due to embargo (tons) | Percentage of countries embargoed |
|-----------------------------|--------------------|------------------------------------------|-----------------------------------|
| Pork                        | 619 700            | 450 800                                  | 72,7 %                            |
| Poultry                     | 522 800            | 338 700                                  | 64,8%                             |
| Cheese, Fish and seafood    | 416 573            | 249 880                                  | 60,0%                             |
| Milk and dairy products     | 1 014 300          | 530 500                                  | 52,3%                             |
|                             | 9 433 300          | 3 640 000                                | 38,5%                             |

* The table was compiled by the authors on the materials of the open press.
In modern Russia, despite the import of foodstuffs, to some extent supplementing the missing own production, there is a serious lag from the norms of consumption for meat and meat products, milk and dairy products, vegetables and fruits, and other food.

In the next Presidential Address to the Federal Assembly, with which Russian President V.V. Putin spoke on March 1, 2018, marked a dramatic improvement in the situation with food in the country, reducing dependence on imports. "Back in the early 2000s, we seriously depended on the supply of imported food," stated President V.V. Putin. - The situation has radically changed ". However, Rosstat's data leaves no hope of believing the speechwriters and numerous presidential advisors who prepared his next message to the Russian elite and the people. So, according to the Federal State Statistics Service and the Russian Accounting Chamber, in 2014, beef imports amounted to 60%, the share of pork imported from abroad reached 31%, poultry meat - 13%, cheese was imported to 48% of the total consumption by Russians, and the share of imports of milk and dairy products reached 60%.

"Virtually all directions of the AIC production are totally dependent on imports," A. Ponomarev, a member of the State Duma Committee on Agrarian Issues, said. If in 2000 the total food imports in the Russian Federation did not exceed 7.4 billion US dollars, then 13 years later, in 2013, it grew 6 times to 43.5 billion dollars. But this huge amount of money could be spent on the development of domestic agriculture and then everyone would benefit from it: both the agrarians, the country's budget, and ordinary Russians. But, unfortunately, hundreds of billions of rubles in terms of currency went to foreign producers instead of supporting the domestic producer. As a result, the number of livestock fell sharply and the defectiveness of such an agrarian policy became apparent even to economists. Therefore, there is a lot of work to be done for many years [18].

7. Conclusion
Consumers of milk and dairy products pay the greatest attention to the quality. The competition on the milk and dairy products market is defense and consumers choose those with high quality. Therefore, producers and sellers should pay special attention to the quality of milk and dairy products. In the face of strong competition in the milk and dairy market, sellers are forced to provide discounts on their price even at high quality in certain periods. This approach increases the absolute value of the firm 's profits. This is mainly achieved by attracting buyers from other market segments. Consumers are informed of the high quality of the products and are ready to purchase them at a relatively low price. At the same time, in order to increase the volume of milk and dairy products sales, it is necessary to carry out objective advertising. The deviation of advertising from objectivity can lead to the opposite result. The reason is that the quality of these products becomes well known after their first consumption. We have researched the prices for milk and dairy products in the retail network of Moscow. The results showed that they are growing much faster than inflation. This is due primarily to the lack of milk. Under such conditions, the Government of the Russian Federation should take more decisive measures to improve the situation with regard to the production of milk and dairy products. From our point of view, the allocation of loan proceeds to entrepreneurs engaged in the production and sale of these products by the fair interest rate at the level of inflation would have a significant positive impact to solve this problem.

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