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Development of dairy production as a strategic priority of modernization of regional agroindustrial complex

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***Abstract* — In the article the dairy production is presented as a constituent of competitiveness, sustainability and security in the regional economic development. The main problem of dairy production is a low provision of Russian citizens with milk and dairy products according to the recommended norms of the Ministry of Healthcare of Russia. The main goal in this industry is to increase the share of domestic milk and dairy products in the national market till 90% for the food security enforcement in the Russian Federation. The aim of research is to analyze the opportunities of dairy production in the provision of competitiveness, sustainability and security of Russian regions. For this purpose the regional specificity of the added value chains is identified. The scenarios of development of the interregional market of dairy production are suggested. The qualitative methods of research (statistical, economic and mathematic) and quantitative methods (analysis of monographs) were used when working with the database on the specificity of the regional dairy production developed by the authors. The research resulted in the identification of the parameters of the regional production concentration, factors influencing a high regional consumption of dairy production, specificity of production hubs' functioning for the creation of short value chains of food supply. The main conclusions are presented as follows. The regional specificity of added value chains of dairy production in the enforcement of competitiveness, sustainability and security of regional development is proved. The possible scenarios of development of the interregional market of dairy production, their advantages and disadvantages are forecasted. The measures necessary for the small business development in the rural area are suggested.**

Keywords* — *dairy industry, value chains, concentration of production, agricultural holdings, farms, food hubs, state support

I. INTRODUCTION

The problem of competitiveness, sustainability and security of the regions has been studied by the scientists for more than a decade. In order to attain the goals of sustainable development approved by the UN [1] the state programs in the Russian Federation are approved [2]. The researches of foreign [3] and domestic scientists are targeted [4, 5]. The results of regions' comparison on the basis of the calculation of the European Index of Regional Competitiveness (RCI), Index of Russian Regions' Competitiveness (AV RCI-2018 beta), Index of Global Competitiveness, system of indices of sustainable development of OECD and some other indices are given. Nevertheless for some industries the solution of such problems has its own characteristic features connected with the specificity of production and consumption of the produced goods. One of such industries is the milk and dairy production. FAO of the UN pays considerable attention to the increase of supply of the world's population with dairy production [6]. At the international level a number of measures are discussed to support the development of dairy production which at the same time can be defined as the constituents of competitiveness, sustainability and security of the regions. They are as follows: ways of creation of value added chains in dairy production [7], creation of production hubs [8], encouragement of dairy production [9]. The importance of the study of constituents mentioned above for the Russian regional economy is explained by a number of factors. The population of Russia uses 24,5% less dairy products than the Ministry of Healthcare of the Russian Federation recommends [11]. The anti-Russia sanctions were introduced and the

government of the Russian Federation started the import replacement program. The government of the Russian Federation also encourages a healthy life style. Then the incomes of the population changed. The government needs and has the opportunity of increasing the dairy production exports as the share of Russia in the developing world market of dairy production makes only 4% what is lower than that of India (20%), the USA (12%), China (5%), Pakistan (5%) and is equal to the volume of milk and dairy production exports of Germany and Brazil both.

The OECD studies consider the development of dairy production as one of the ways of struggle against poverty and also a way of growth of the economic importance and independence of women [10]. Since 2015 in Russia the most reasonable way of dairy production organization is being discussed [16, 17] as in the world practice 25,4% of milk is farmed by 20 largest producers among which the share of cooperatives is more than 50% and the share of the largest producers is more than 60% [14]. In Russia the main agricultural producers are the agricultural holdings [15] which are located unevenly across the territory of Russia. The goal of this article is to study the opportunities of dairy production in the provision of competitiveness, sustainability and security of Russian regions. For the implementation of this goal the following tasks were solved: identification of regional specificity of value added chains, development of scenarios of development of interregional market for dairy production. This allowed to choose the “best practices” and to suggest the measures for competitiveness, sustainability and security growth of the regional economy in the dairy production.

II. Materials and Methods (Model)

The study was carried out on the basis of the analysis of the data base formed by the authors from the information of the National Union of Milk Producers of Russia [12] and the Federal Service for State Statistics [13]. The statistical instruments were used: groupings, comparative and factor analysis, calculation of time series. The economic and mathematical methods were also used: correlation and regression analysis, classification, coefficient method. The qualitative (monographic) research of the authors allowed expanding the range of the used information for a more detailed study of specific regions, the Volgograd region in particular.

III. Results and discussion

The methods of research used for the created data base allowed receiving the diagnostic parameters of dairy industry in Russia and allowed assessing the possible ways of increase of competitiveness, sustainability and security of regional economy on the use of the “best practices”.

A. Regional specificity of value added chains in the dairy production market in the enforcement of competitiveness, sustainability and security of the regional development

The creation of value added chains in dairy production is analyzed first of all according to the type of firm producers [18]. According to this criterion in Russia there exist three types of regions: a) regions with the domination of agricultural firms. They are Central Federal District, North-Western Federal District, Volga Federal District, Ural Federal District, Siberian Federal District; b) regions with equal shares of agricultural firms and household farms. They are Southern Federal District and Far Eastern Federal District: c) regions with the domination of household farms. It is the North Caucasian Federal District. The dairy production industry in the Central Federal District and North Western Federal District (in these regions the share of production of agricultural firms is the largest) and in the North Caucasian Federal District (the share of household firms is larger than the production of agricultural firms) is internally homogenous. In other federal districts the situation in the dairy production is less homogenous. In the Krasnodar krai (Southern Federal District) in contrast to other regions of the district, 73,5% of milk for processing is produced in agricultural firms. In the Volga Federal District and the Siberian Federal District the production of milk in household farms is higher in the Saratov oblast (69,5%), Chuvash Republic (58,4%), Tuva Republic (79,5%), Zabaykalsky krai (80,0%), Sakha (Yakutia) Republic (45,1%), Amur oblast (57,7%) and Jewish Autonomous Region (67,2%). In Khanty–Mansi Autonomous Okrug – Yugra (Ural Federal District) the largest share of commodity milk is produced by farmers (peasant farm firms) and by individual entrepreneurs. There exist regional distinctions in the share of commodity milk in the total volume of production by all economic agents which are connected with the domination of agricultural firms in comparison with other economic agents. In the whole the share of commodity milk during 2016 – 2018 is growing. In the North Caucasian Federal District, Northern Federal District and Southern Federal District it makes more than 60% and less. In other Federal Districts the share is 70% and more. From the point of view of the creation of value added chains all the mentioned above means that in the largest part of the regions their formalized types based on the potential of large producers prevail.

At the same time the degree of the concentration of dairy production across the regions allows speaking about the existence of the specificity of the added value creation (Table 1).

Although in the whole the milk and dairy production in the Russian Federation is lowly concentrated (Herfindahl-Hirschman Index in 2016, 2017, 2018 makes 250,47; 269,48; 251,0 correpsondingly) but among the markets of federal district with a low concentration there is only one milk and dairy market, and it is the market of the Central Federal District. It has the final rank upon the regional concentration of commodity milk production in comparison with other districts. The share in the index of its largest producers of commodity milk makes up 60,55% (2016) and grows up to 63,47 % (2018).

The markets of the Volga Federal District and Siberian Federal District rank 6 and 7 according to the value of Herfindahl – Hirschman index. The total among them is the

presence of one large producer having more than 45% of the index inside the district: Republic of Tatarstan and Altai krai correspondingly. The difference consists in the fact that the Volga's Federal District two largest regions producers make 59% of the index, in the Siberian Federal District they make up 63% what is very close and if we take into the analysis 4 producers, the differences are becoming significant and the values make 76 and 92%. This means that in the Siberian Federal District 4 regions provide almost a complete volume of production of commodity milk.

TABLE I. HERFINDAHL-HIRSCHMAN INDEX / RANK ACCORDING TO THE CONCENTRATION

Federal Districts	**Years**		
	2016	***2017***	***2018***
Central Federal District	797.7 / 8 [a]	821.4 / 8	837.4 / 8
North Western Federal District	2250.1 / 5	2285.1 / 4	2321.3 / 4
Volga Federal District	1061.8 / 6	1056.5 / 6	1052.0 / 7
Ural Federal District	2274.9 / 2	3344.8 / 2	3346.9 / 2
Siberian Federal District	1702.1 / 7	1711.3 / 6	1708.3 / 6
Southern Federal District	3643.3 / 1	3550.9 / 1	3555.7 / 1
Far Eastern Federal District	2290.4 / 4	2303.6 / 5	2314.9 / 5
North Caucasian Federal District	24215.5 / 3	2287.8 / 3	2264.6 / 3

a. Calculated by the authors on the basis of the data base mentioned above

The markets of North Western Federal District, Ural Federal District, Southern Federal District, Far Eastern Federal District, North Caucasian Federal District are highly concentrated but the nature of this concentration varies. In the first and the second districts four regions provide the bulk of commodity milk. They are the Vologda and Leningrad oblasts (87%) in the North Western Federal District, and Sverdlovskaya and Tuymenskaya oblasts (91%) in the Ural Federal District. When analyzing the markets of dairy production in the Southern Federal District and the Far Eastern Federal District and judging from the previous parameters we could wait low values of Herfindahl – Hirschman index. But according to this index the Southern Federal District has the first rank and the Far Eastern Federal District has rank 4 or 5. This fact is explained by the presence of two or three producers giving more than 94% of the index (Krasnodar krai, Rostov oblast in the Southern Federal District, Sakha (Yakutia) Republic, Amur oblast and Primorsky krai in the Far Eastern Federal District).

In the North Caucasian Federal District 95% of concentration index accounts for Republic of Daghestan, Kabardino Balkar Republic and Stavropol krai.

So, the internal markets of federal districts are presented by a few large regions (constituent entity of the federation). This fact again confirms the fact that chains of added value are largely formalized when some regions in the districts dominate, although this situation is less typical for the Volga Federal District and the Central Federal District. A large share of sales is made by the producers being part of the production holding firm "Group of Companies Danone in Russia" and PepsiCo which according to the assessments of the National Union of Milk Producers supply 15% of the Russian Dairy Production. Moreover these companies support the agricultural producers at their expense. For instance, Danone company financed the construction of new mega farms with the total growth of number of heads of livestock at about 30 000 heads. The company helps buying or getting bred heifers, assists in the attraction of investments from partner banks. From the point of view of a specific region this means that at the conservation of the existing tendencies of milk production the most advanced milk producers will give a further production growth. The regions outsiders today must either develop new, specific measures for the growth of their own dairy production or try to integrate with other regions on the basis, for instance of long term contracts [19].

B. Scenarios of development of interregional market of dairy production

Today the regions which produce the bulk of commodity milk are located in the regions where their production within agricultural firms prevails, an exception is the Krasnodar krai. These regions are Tatarstan and Bashkortostan in the Volga Federal District, Altay krai in the Siberian Federal District, Voronezh oblast in the Ural Federal District. They have the following common traits. 1) They have a comparatively higher consumption of dairy products in comparison with the recommended norm (111, 96, 100 and 83% correspondingly). 2) In 2016 and 2017 from 3849 to 26900 resting places for cattle were constructed or renewed in these regions; 3) Real incomes of the population in the territories mentioned above in 2017 in comparison with 2016 incerased. The Krasnodar krai produces the bulk of commodity milk in its agricultural firms but this region differs from the regions mentioned above in that the milk and dairy products consumption makes 69% from the rate recommended by the Ministry of Healthcare of the Russian Federation. There were no new constructed capacities in the milk and dairy production industry. The real incomes of the population in 2017 in comparison with 2016 reduced. When comparing these data it can be said that for the growth of milk consumption the growth of real incomes of population and the expansion of production volumes within the regional market are needed.

Such a growth judging from the international experience of milk and dairy production can be provided by means of the expansion of the agricultural cooperation. And if we take for analysis Russia we can speak about the attraction of large producers from other regions into the territory of a region for the increase of production. The highest potential for the attraction into the problematic regions have the TNCs ("Group of Companies Danone in Russia" and PepsiCo) and the producers from TOP-20 of the industry under analysis ("EcoNiva-APK", PC "Firm Agrokomplex named after N.I.

Tkachev" and others). In the first case it is necessary to ensure the support measures included into the so called "special investment contracts". In the second case it is important to develop the institutional sphere for agriculture by means of provision of small agricultural producers with consulting, informational, financial and supply services. Judging from the tendencies of dairy production development the first group of measures was chiefly used. The share of cooperative farms which use the state support make up 34,5%, the accessibility of credits made up 10,7% but at the same time these figures for large scale producers made up 75% and 37,4% correspondingly [20]. In 2019 for the development of small business in agriculture the financing is expected to be almost 40% higher than in 2018. In the nearest future 18 200 new small and medium sized firms are said to be established in the agricultural industry. The intensification of small and medium sized enterprises in agriculture is called one of the priorities of state policy what was reflected in the development of the federal project "Creation of support system for farmers and development of agricultural cooperation" [21].

The support of the activity of cooperative farms will influence the value added chains. Michael Porter suggested for the growth of markets' competitiveness revising products, markets, system of supply and creating supporting (additional) industrial clusters [22]. One of perspective instruments for the solution of such issues is the creation of production hubs which are considered not as an intermediary but as a strategic net ensuring the local supply system (short chain). Besides a positive impact on the economic state of local milk producers has the construction of hubs improves the ecological situation as this reduces the hydrocarbon trace of cargo transportation. According to the studies carried out in 2013-2017 in the USA [23], the hubs ensure the development of the economy as a whole, have a positive impact on the industry's development, support the farmers, help solve economic, environmental and social (healthy life style) tasks but they also face challenges connected with a long term financial sustainability and for the moment slowly ensure the safety certification of food products. At the same time in various researches [24] it is noted that the economic efficiency, ecological sustainability and social integration of short chains of production supplies is ensured only in the situation if they are structured according to the principle of justice.

The prototypes of production hubs in Russia are the centralized whole sale and production markets which existed in the country. In 2000s of the XXI century 27 centralized wholesale and production markets were established but at a severe and unfair competition a part of them left the market [25]. The government returned to the issue of production hubs' construction in Russia in 2018. Vnesheconombank decided to establish 10 federal and 30 regional wholesale and distribution centers under the state and private partnership contracts. These centers will use digital technologies which allow cooperating even with the consumers of production who are physical persons. The area for their location will be determined according to the interest of the regions. Besides in Great Moscow Area (Moscow oblast) the Russian and French production hub is being constructed and this distribution center will be one of the largest in Russia and will ensure the possibility for supply of regional agricultural production into the markets in the European (Central) Part of Russia.

IV. Conclusion

A. Specificity of value added chains in milk and dairy production in the competitiveness, sustainability and security of regional economic deveopment

The regional specificity of value added chains in milk and dairy production in the provision of competitiveness, sustainability and security of a region looks as follows: 1) in the largest part of the regions the formalized value added chains formed by large agricultural firms including the TNCs "Group of companies Danone in Russia" and PepsiCo prevail; 2) every federal district of Russia has the regions which produce the bulk of milk and dairy production and they specifically supply dairy production into the neighboring territories both inside and outside the district; 3) short supply chains of food products inside the regions are not widely spread and started developing thank to the regional programs of local producers' support.

B. Possible scenarios of develompent of regional milk and dairy market

The possible development scenarios of domestic regional market of dairy production are presented as follows: 1) inertial one which implies the growth of milk production (mainly due to the use of potential of agricultural organizations and TNCs) in the regions where their production is developed today in an intensified manner (growth of productivity of live stock animals, improvement of stock breeding, a deeper raw material processing what gives the opportunity for entrance into a foreign market, including the Chinese one); 2) change of the tendency of an active development of agricultural holdings which is connected with the growth of dairy production by small businesses (households) in the rural area what is the reflection of the perspective directions of the public development at the federal level. Each of the mentioned scenarios has its advantages and disadvantages. The advantages of the first scenario are the fast growth of production volumes, foreign market entrance, reduction of hydrocarbon trace when farming dairy production (the higher the productivity of livestock is, the lower the hydrocarbon trace is). One of the disadvantages is that such a direction of milk production is widely spread in the world practice as the cooperative forms are used. The use of robots in the industry is growing. The reduction of jobs is observed. The migration of population from the rural area and the loss of its mode of life are seen. The advantages of the second scenario are the disadvantages of the first one and vice versa. The main challenge of its implementation is the necessity to change the existing development trend what requires considerable managerial and financial efforts. In the country there exist groups of stakeholders interested in the implementation of every scenario.

C. Measures necessary for the growth of small business in rural area

Measures necessary for the growth of small business in the rural area are presented as follows: 1) establishment of institutes of agricultural cooperation as in the world practice more then one half of the largest milk producers are the cooperatives which have a developed system of farmers' support; 2) increase of state support for small and medium sized business by means of providing them with large volumes of financing in comparison with large enterprises what implies the change of tendencies of farmers' support developed in Russia during previous years; 3) formation of short value added chains for product supplies: to promote the purchase of production of local producers, to identify the reasons for its poorer price attractiveness and to provide their elimination (for this the development of new methodologies of price formation of the Federal Antimonopoly Service is needed), to construct production hubs (local ones or regional ones inside municipal wholesale and distribution centers) which are structured according the principle of fairness.

Every scenario of development of regional dairy markets will provide the growth of milk production. The milk consumption will be determined by the growth of real incomes of population based on the programs of poverty struggle, growth of a minimal salary, growth of the targeted social support, growth of innovative productions and other programs implemented in the country. When using an inertial scenario of dairy production in the regions, the regions outsiders should take measures for the development of inter regional integration on the basis of long term contracts for the growth of milk consumption in their territory. When increasing the number and volumes of dairy production in the rural area due to the development of small and medium sized businesses the change in the paradigm of state support, promotion of cooperatives, support of work in the creation of short value chains of production supplies are needed.

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