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Spatial development of the national fruit and berry market

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Subject. The issues of spatial development of the fruit and berry market become especially important due to the increasing asymmetry in the development of administrative-territorial units of the state, strengthening of globalisation processes with simultaneous regionalisation and integration of markets. They lead not only to changes in socio-economic components, but also have a significant impact on the development of space, leading to its transformation.

Objectives. To enhance theoretical provisions concerning the spatial development of the fruit and berry market and to determine the trends in the spatial development of this market in Russia. To propose measures to improve the efficiency of fruit and berry market development in terms of the spatial aspect.

Methodology. We used the following methods of scientific knowledge to achieve our goals: dialectical; analysis, synthesis, and comparison. In the process of research, various literature sources were studied: periodicals, monographs, and statistical digests.

Conclusions. Conclusions were drawn about the spatial development of the fruit and berry market as a combination of changes that improve food supply to the population of certain territories. The research revealed significant spatial differentiation in both production (supply) and consumption (demand) of fruits and berries. Theoretical and analytical research allowed us to conclude that it is necessary to support demand (generate demand) and supply (stimulate producers in different categories) of the domestic fruit and berry market.

Key words: fruit and berry market, spatial development, Russian Federation, federal districts, trends.

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Introduction

There are territorial imbalances in the formation of demand and supply of fruits and berries, satisfaction of actual and potential needs of consumers, and in pricing. They predetermine the need for in-depth study of the market elements in order to identify resources for sufficient provision of the population with essential products from domestic sources.

The growing interest in the issue of spatial development and the lack of theoretical and methodological provisions, disclosing this concept from modern positions as applied to the fruit and berry market, determine the vector of research into the functioning of commodity market segments from the standpoint of spatial approach. They also substantiate the feasibility of a comprehensive analysis of economic factors, phenomena, processes, regularities, and trends.

The studied issues are also relevant due to the need to achieve the goals out-lined in strategic government documents: the Food Security Doctrine of the Russian Federation, the Forecast of Scientific and Technological Development of the Agro-Industrial Complex of the Russian Federation until 2030, the Strategy of Spatial Development of the Russian Federation until 2025, the Strategy of National Security of the Russian Federation, etc.

The aim of the study was to substantiate methodological approaches to the spatial development of the fruit and berry market, to identify trends in the spatial development of the Russian fruit and berry market, to outline its problems, and to propose measures to address them.

To achieve the aim of the study, it was reasonable to solve a number of tasks. The key tasks were to clarify the content characteristics and sectoral features of the spatial development of the fruit and berry market, to analyse and evaluate its main elements, to identify trends, and to determine the potential of the spatial development of supply and demand in the fruit and berry market.

The need to study the issue of spatial development of the fruit and berry market arises from the relationship between the functioning of the market and its geographical location and changes in its boundaries. Another reason is that market elements depend on the activities of specific producers and the behaviour of consumers, who, in turn, are tied to a certain territory and population distribution system. In this regard, the development of the fruit and berry market in spatial terms is determined by the sectoral characteristics of the products and the territory where they can be purchased.

Materials and methods

The study uses general scientific methods of cognition (historical, abstract-logical, and dialectical); methods of theoretical generalisation and comparative analysis; statistical, economic-mathematical, tabular, and graphical methods of visualisation of statistical and calculated data, and theoretical and practical developments of the authors.

The information base for the study included statistical and analytical data of Rosstat and the Ministry of Agriculture of the Russian Federation, the results of monitoring of the state programme for the development of agriculture and regulation of markets for agricultural products, raw materials, and food; Internet resources; regulatory and legislative acts of the Russian Federation concerning the agro-industrial complex, strategic planning of spatial development, regulating transformations in the agri-food system; materials of industry meetings and conferences.

The theoretical basis of the study included the provisions of classical economic theory, regional economics, spatial development, evolutionary, and institutional theories, scientific works of Russian and foreign scientists and specialists on the issues of spatial development of agri-food markets, the issues of economic development of agricultural production.

Results

For the purposes of the study, we disclosed and generalised classical and modern theories, concepts, and models linking the spatial development and peculiarities of functioning of the fruit and berry market. We carried out a structural-semantic analysis and defined the category of “spatial development of the fruit and berry market” as a set of qualitative and quantitative changes in its structural characteristics (demand, supply, and prices), mechanisms (functioning, regulation), and organisational and economic relations of the parties, which are oriented towards the development of the fruit and berry market.

The conducted research allowed us to conclude that the geographical boundaries of markets are not clear due to the heterogeneous distribution of demand and supply of fruit and berry products in space. The competition and partnerships, which determine organisational and economic relations in the market, are formed by entities dispersed in space, and its size may not coincide with the administrative territories where consumers are located (places where products are sold).

Uneven territorial distribution of agricultural production, concentration of population in certain areas, different standards of living, and migration processes lead to a mismatch between consumers’ demand and opportunities for its fulfilment. As a result, the existing socio-economic differentiation urges the issue of spatial development of agri-food markets and, in particular, the fruit and berry market. The main challenge is to balance supply and demand in different territories (Martin & Martin, 2023; Mason-D’Croz et al., 2019; Springmann et al., 2018; Suvorova, 2019).

The results of the study show that the spatial development of a market makes it possible to develop competitive advantages through the formation of framework conditions, greater development potential, availability of infrastructure services, concentration, and interactions between companies and networks (Flaig et al., 2021; Xu et al., 2020; Shvets, 2021).

It should be noted that the spatial development of the fruit and berry market can be considered at any level of administrative-territorial division: federal, regional, or municipal (district). In the market space, the boundaries of these levels do not impede the free movement of goods. With regard to space, such administrative-territorial units as regions and districts are quite promising in terms of implementation of specific measures at these levels. These measures may include the regulation of sectoral markets, the support of agricultural producers, and the development of infrastructure (information, marketing, transport, logistics, and trade subsystems) (Polunina & Popova, 2022; Charykova et al., 2022).

International experience and domestic practice show that effective spatial development of agri-food markets is promoted by appropriate territorial concentration of production, corresponding to natural conditions, along with established inter-territorial interaction, and complementary processes of cooperation and integration.

Components of the market functioning mechanism (demand, supply, price, and competition), interacting in its space in the process of the emergence of commodity-money relations, influence each other, both positively and negatively. As a result, a market situation is established, which characterises the ratio of consumer demand and supply, as well as the price level in a competitive market (Charykova et al., 2021; Wang et al., 2019).

Demand in the fruit and berry market can be defined as a need that is spatially distributed and has a monetary value. Demand as an economic category is heterogeneous in space and over time.

Supply in the fruit and berry market is a set of goods that are placed in space, have a certain price, and are supplied by sellers to the market (Altukhov, 2020; Pashina, 2013).

The demanded quantity can indicate the standard of living of the population, since demand characterises the purchasing power in the consumer market, which is directly related to income (Dvoryadkina, 2014; Shevyakov & Kiruta, 2009).

Product supply is the basis for increasing the sphere of consumption and improving the living standards of the population. Its formation depends on the spatial (territorial) division of labour, the ratio between the products produced by local enterprises and imported products that are not produced in the given territory. Achieving an optimal ratio between supply and demand is the primary task in the food supply system.

The importance and spatial features of the main market characteristics (demand and supply) made it necessary to identify the factors determining them. These factors may be used to optimise the spatial development of the fruit and berry market (Fig. 1).

The price of fruit and berry products is also spatially differentiated, as it depends on the costs incurred in a certain territory, the prices of competitors operating in this territory,

and the purchasing power of the population (Kostusenko & Smekalov, 2013).

It is necessary to consider one more fact. Products offered to consumers in a certain territory may be imported from other regions, where the costs and, accordingly, the price of products may differ. Thus, the market equilibrium of supply and demand is ensured both through the local production of agricultural products (in territories with favourable conditions for agriculture) and through products imported from other territories. (Zakshevskaya, 2021).

To assess the spatial development of the fruit and berry market in Russia, we analysed its structural elements corresponding to the demand satisfaction and supply changes in certain territories and over a certain time period.

Over more than thirty years, the average per capita consumption of fruits and berries in Russia per year has increased 1.8 times,

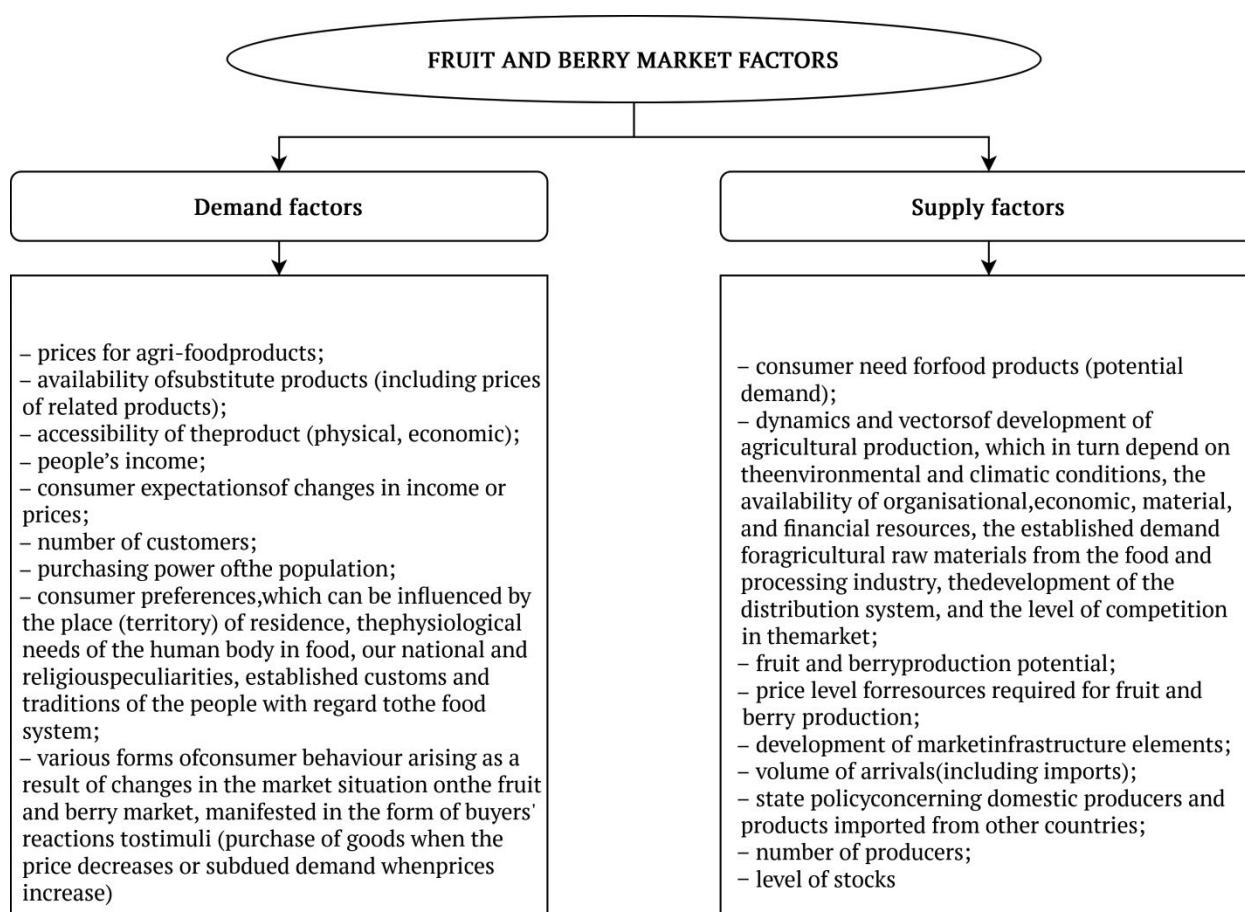


Fig. 1. Supply and demand factors in the fruit and berry market

[compiled by the authors based on (Isaksen et al., 2020; Suvorova, 2021; Charykova et al., 2022)]

from 35 kg in 1991 to 63 kg in 2021, which characterises the change in demand. Over the last 10 years, consumption has fluctuated within 59 and 63 kg. This is despite the fact that more than half of the consumed fruits and berries are imported from other countries (59.4 % in 2021). Despite the growth of per capita consumption, its actual level in the Russian Federation is below the recommended annual consumption of 100 kg¹.

If we consider the dynamics of this indicator in the context of the regions of the Russian Federation, there is a significant differentiation, which is due to several reasons:

¹ On Approval of the Recommendations on Rational Norms of Consumption of Food Products that Meet Modern Requirements for Healthy Nutrition : Decree of the Ministry of Health No. 614 dated 19 August, 2016 (edited 1 December, 2020). URL: <https://docs.cntd.ru/document/420374878> (accessed on: 31.01.2023).

the regions' capacity for their own production of fruits and berries, the level of income of the population, existing customs and habits in food consumption, and the level of development of market infrastructure and logistics.

According to the assessment of positioning of market entities, the Southern Federal District (SFD) is the leader in fruit and berry consumption in the Russian Federation. Over the ten-year period of observation, its level of consumption exceeded the national average between 20.6 % in 2014 and 2021 to 31.1 % in 2012 (Fig. 2). The Siberian Federal District (SibFD) has the lowest level of fruit consumption in the country (19.4–26.7 % less). It lagged behind the SFD by 25–34 kg per capita in different years.

The top ten regions by annual fruit and berry consumption per capita included: 2 regions in

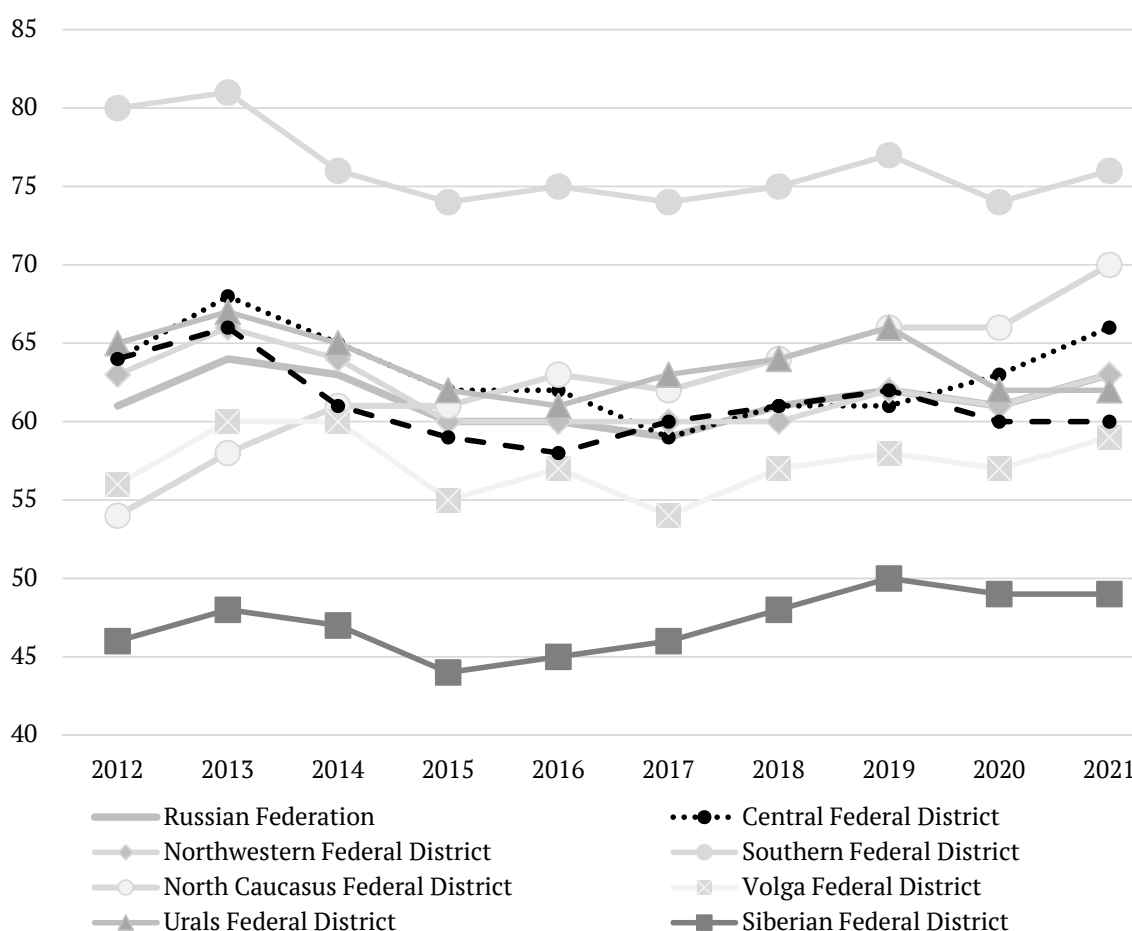


Fig. 2. Fruit and berry consumption in federal districts of the Russian Federation, kg per capita [based on the data from <https://rosstat.gov.ru>]

the North Caucasus Federal District (NCFD): the Kabardino-Balkar Republic (1st place, 120 kg) and the Republic of Dagestan (78 kg); 2 regions in the Southern Federal District: the Krasnodar Territory (94 kg) and the Republic of Adygea (91 kg); the Vologda Region (80 kg) in the Northwestern Federal District (NWFd); 2 regions in the Central Federal District (CFD): the Voronezh Region (80 kg) and Moscow Region (79 kg); the Republic of Tatarstan (78 kg) in the Volga Federal District (VFD); the Primorye Territory (77 kg) in the Far Eastern Federal District (FEFD); and the Kurgan Region (76 kg) in the Urals Federal District (UFD).

The product supply in the Russian fruit and berry market includes domestic production, imports, and stocks. It should be noted that Russian producers cover on average only 45 % of fruit and berry consumption. Thus, the self-sufficiency target of 60 % set in the Food Security Doctrine has not been achieved ².

This is despite the fact that fruit and berry production in Russia has increased significantly over the last 10 years: grape production has

increased by more than 2.5 times; production of pome fruits has increased by almost two times; production of stone fruits has increased by 38 %, and production of berries has increased by 9 % (Fig. 3).

The SFD (31 %) and the NCFD (27 %) produce more than half of the country's fruit (58 %). The contribution of producers in the CFD (17.7 %) and the VFD (14.4 %) is significantly lower. The shares of the NWFd, UFD, SibFD, and FEFD are insignificant (3.6 %, 2.9 %, 2.7 %, and 0.8 %, respectively). Over the last 10 years, fruit and berry production in the Russian Federation has increased significantly, almost 1.7 times, with a slight increase in population (3 %). Therefore, the per capita production indicator has increased (by 35 %) (Fig. 4).

In 2021, the regions of the North Caucasus Federal District produced 95 kg of fruit per capita, thus approaching the recommended annual consumption.

The list of leaders in fruit and berry production is almost similar to the top ten leading consumers: 4 regions in the SFD: Krasnodar Territory (1st place, 565.2 thousand tonnes), the Republic of Crimea (164.3 thousand tonnes), the Volgograd Region (151 thousand tonnes), and the Rostov

² On Approval of the Food Security Doctrine of the Russian Federation : Presidential Decree No. 20 dated 21 January, 2020. URL: <https://www.garant.ru/products/ipo/prime/doc/73338425> (accessed on 31 January, 2023).

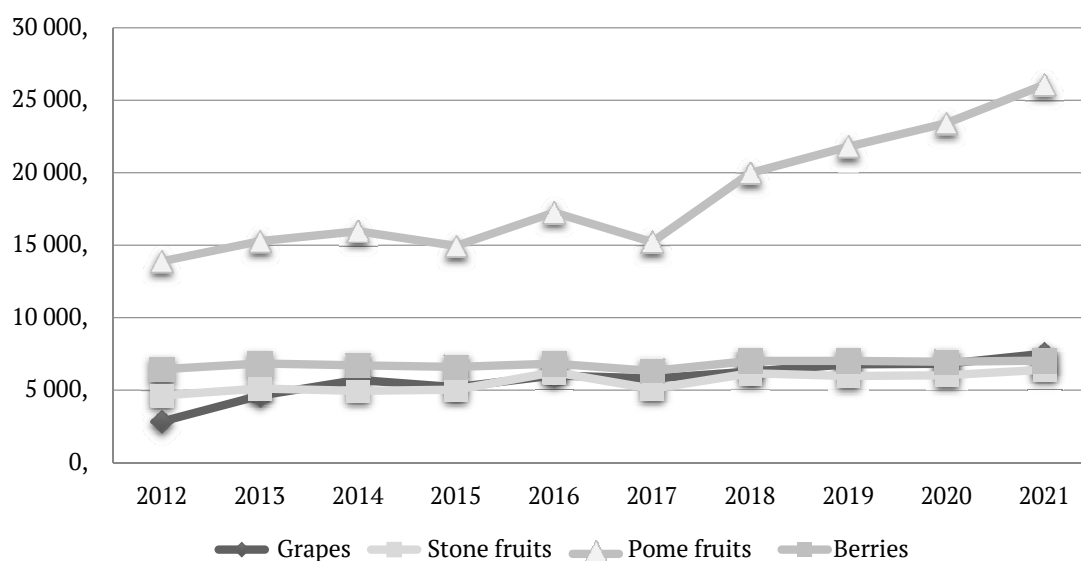


Fig. 3. Fruit and berry production in the Russian Federation in 2012–2021, thousand tonnes [based on the data from <https://rosstat.gov.ru>]

Region (117.3 thousand tonnes); 2 regions in the NCFD: the Kabardino-Balkar Republic (535.5 thousand tonnes) and the Republic of Dagestan (200.4 thousand tonnes); 3 regions in the CFD: the Moscow Region (153 thousand tonnes), the Voronezh Region (143 thousand tonnes), and the Lipetsk Region (98.3 thousand tonnes); 1 region in the VFD: the Republic of Tatarstan (101.1 thousand tonnes).

The product structure of domestic supply in the fruit and berry market includes a wide range of products, as various types of fruits and berries are grown in the Russian Federation: pome fruits (pear, quince, apple, etc.), stone fruits (cherry, wild cherry, plum, apricot, peach, etc.), berries (strawberry, wild strawberry, currant, gooseberry, raspberry, etc.), and grapes. Pome fruits comprise the largest segment in the Russian market (Fig. 5).

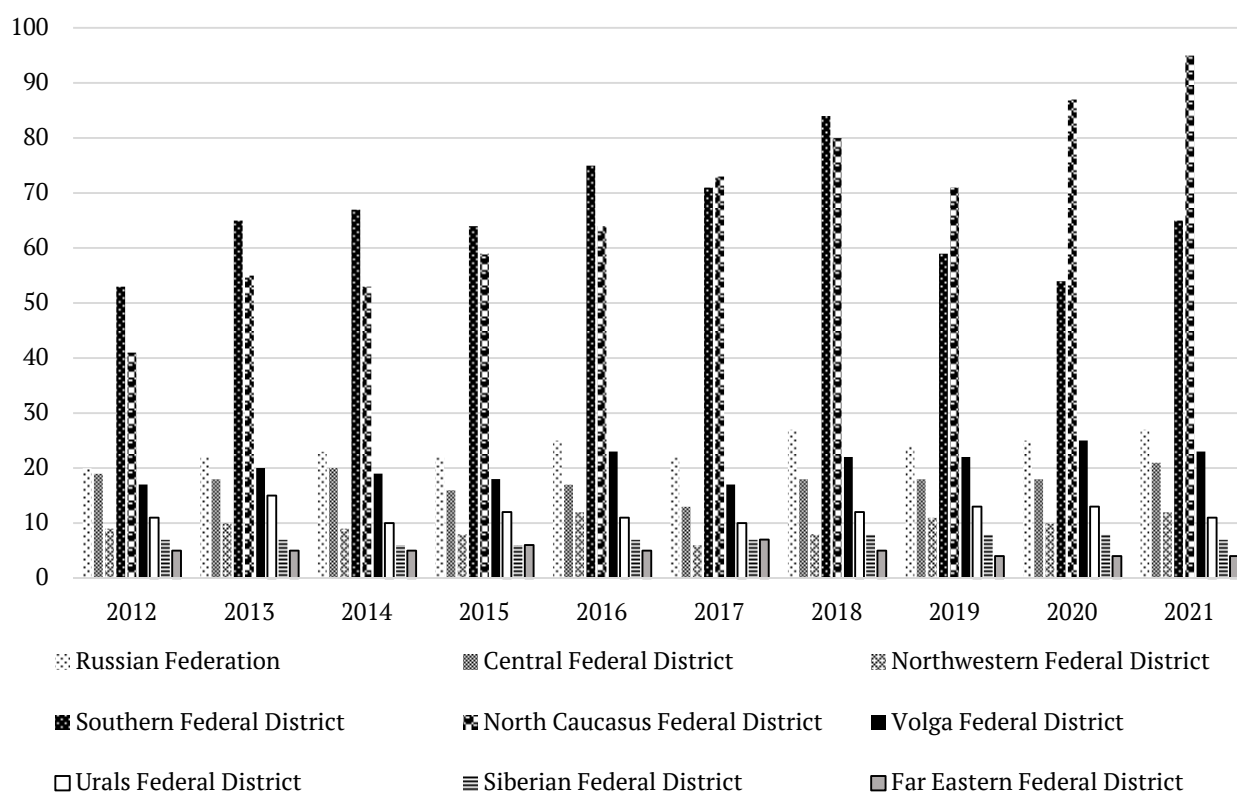


Fig. 4. Fruit and berry production in federal districts of the Russian Federation, kg per capita [based on the data from <https://rosstat.gov.ru>]

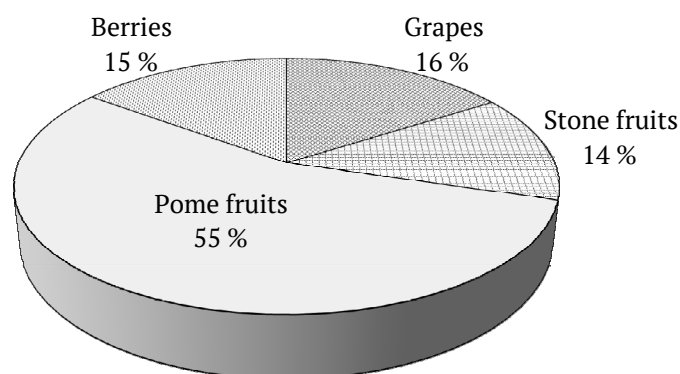


Fig. 5. Structure of fruit and berry supply in the Russian Federation by types, % [based on the data from <https://rosstat.gov.ru>]

Fruits and berries are mostly produced by agricultural enterprises and household plots. Peasant farms produce a small share of fruits and berries in the country.

In particular, household plots are the main producers of stone fruits (89 %) and berries (97 %) in the country. They also produce almost half of pome fruits (49 %), while agricultural enterprises take the second position, 45 % (except for the Southern Federal District, where almost 80 % of pome fruits are produced by agricultural enterprises). On the other hand, 70 % of grapes are produced by agricultural enterprises, while peasant farms account for a little more than 20 %, and household plots produce only 10 %. This is due to the fact that grapes are mainly produced in the SFD and NCFD regions, which have favourable climates. In other federal districts, grapes are grown in household plots for individual consumption, and the production volumes are low. The contribution of agricultural holdings and peasant farms in growing berries is minimal, 1.3 % and 1.5 %, respectively. These types of producers have a slightly higher share in growing stone fruits (peasant farms account for 3.5 % and agricultural enterprises – for 7.4 %).

The traditional leaders in the cultivation of pome fruits are the regions of the Southern Federal District (in particular, the Krasnodar Territory and the Republic of Crimea, which account for 60.3 % and 17.2 % of the district's production, respectively) and the North Caucasus

Federal District (in particular, the Kabardino-Balkar Republic and the Republic of Dagestan, which account for 64.7 % and 14.8 % of the district's production, respectively) (Table 1).

The Central Federal District is also an important producer of pome fruits. Three regions account for almost half of the district's pome fruit production (48.5 %). They are the Voronezh Region (17.2 %), the Moscow Region (16.1 %), and the Lipetsk Region (15.2 %).

Half of the country's stone fruits are grown in the SFD (the main producers are the Krasnodar Territory with a 35 % share in the district, the Rostov Region – 25 %, the Volgograd Region – 18 %, and the Republic of Crimea – 13 %) and the NCFD (the main producers are the Republic of Dagestan with a 49 % share in the district and the Kabardino-Balkar Republic with 26 %). The VFD also makes a significant contribution of 20 % (in particular, the Republic of Tatarstan and the Samara Region, which produce 19 % and 14 % of the district's stone fruits, respectively), as well as the CFD (18 %) (the main producers are the Voronezh and Moscow Regions with 22 % and 16 % of the district's production, respectively).

The Moscow Region became the country's leader in berry production in 2021 (6.5 % of Russian berry production, 27 % of production in the CFD). Industrial production of berries (strawberries, currants, raspberries, blackberries) is rapidly developing and well supported in this region. The top ten includes another CFD region,

Table 1

Fruit and berry production by type in the Russian Federation in 2021, %

Federal Districts	Types of fruit and berry products							
	Pome fruits	Position	Stone fruits	Position	Berries	Position	Grapes	Position
Russian Federation	100,0	–	100,0	–	100,0	–	100,0	–
CFD	21,2	3	17,5	4	23,9	2	0,7	4
NWFD	3,9	5	2,7	7	7,2	6	0,1	6
SFD	29,7	1	28,0	1	14,6	3	53,4	1
NCFD	29,1	2	23,9	2	3,0	8	43,1	2
VFD	12,9	4	19,8	3	28,7	1	2,3	3
UFD	1,8	6	3,7	5	9,0	5	0,1	7
SibFD	1,2	7	3,3	6	10,4	4	0,1	8
FEFD	0,2	8	1,0	8	3,3	7	0,2	5

Source: based on the data from <https://rosstat.gov.ru>

the Voronezh Region (14 % of berry production in the district). In the VFD, which produced the largest volume of berries in 2021, the leading producers are the Nizhny Novgorod Region (14 % of the district's production), the Republic of Tatarstan (13 %), the Perm Territory (13 %), and the Republic of Bashkortostan (10 %).

Grape cultivation is the absolute prerogative of enterprises in the North Caucasus Federal District and the Southern Federal District. The Republic of Dagestan (32 %), the Republic of Kabardino-Balkaria (3 %), and the Republic of Chechnya (2 %) were leaders among the regions of the North Caucasus Federal District by the contribution to the national production. The shares of the Southern Federal District regions, namely, the Krasnodar Territory (29 %), the Republic of Crimea (16 %), the Stavropol Territory (6 %), Sevastopol (4 %), the Rostov Region (3 %), and the Volgograd Region (1 %), are also significant. The Saratov Region (1 % of Russian production, 34 % of production in the Volga Federal District) represented the Volga Federal District among the top ten producing regions.

Thus, there are certain peculiarities in the spatial development of the fruit and berry market. They are related to the specific conditions in the producing regions, as well as consumption traditions, and marketing properties of the product.

Despite the overall growth of production volumes in Russia, the low production of fruits and berries in districts and regions unfavourable for these products, in addition to the high cost of products and low incomes, leads to insufficient consumption. Thus, when comparing fruit prices and incomes of the population with the average Russian indicators, some disproportions were revealed (Table 2).

The analysis of current prices showed that in some regions the prices exceed the average Russian level and incomes are lower. So, the population is not able to buy fruits and berries in the necessary quantities. The population prefers to spend more money on dairy and meat products, thus reducing fruit and berry consumption.

The assessment of federal measures and regional policies showed that the overall growth of fruit and berry production in the country is to a large extent ensured by regional and federal support measures (investments in breeding, horticulture, and nursery production of fruits and berries). However, analytical studies indicate the need for more active state intervention in the processes of balancing the spatial development of market elements (supply and demand).

Conclusions

As the conducted research demonstrated, the efficiency of the functioning of the fruit

Table 2

Comparison of fruit prices and incomes of the population in 2021 with the average Russian levels

Federal Districts	Average prices for fruit (apples, pears, oranges, grapes, lemons, bananas), % of average Russian prices	Average per capita income of the population per year, % of average per capita income in Russia
Russian Federation	100	100
CFD	89–101	136
NWFD	92–109	111
SFD	79–100	87
NGFD	75–107	67
VFD	87–95	78
UFD	99–107	99
SibFD	104–117	76
FEFD	124–166	105

Source: based on the data from <https://rosstat.gov.ru>

and berry market in the spatial aspect depends on the territorial factors and sectoral features of the commodity. They influence the ratio of supply and demand and, consequently, the formation of the final equilibrium price. In this regard, it is important to regulate the processes of interaction between supply and demand. The functioning of regulatory mechanisms (state and market) makes it possible to eliminate or minimise the imbalance between supply and demand arising from spatial differences. Several options are possible:

1. In order to improve the supply of fruits and berries to the population it is advisable to implement measures to create conditions for the growth of production, which will lead to an increase in product supply in the market. To achieve this, it is necessary to:

Optimise the species structure of production by taking into account territorial environmental conditions and existing specialisation.

Increase the volume of investments in the development of production (by increasing the investment attractiveness of the agricultural sector).

Refocus the population's demand for insufficiently demanded products in order to compensate for the lack of certain products (including imported ones).

2. To implement policies to shape and stimulate public demand (by supporting low-income populations) and redistribute products from regions with surplus production to regions in need of fruits and berries at affordable prices (perhaps through public procurement).

3. To develop infrastructure subsystems.

Continuous improvement of the mechanisms of the regulation (state and market) of the fruit and berry market, adequate to the market conditions, is able to ensure the levelling of negative effects of the constantly changing levels of supply and demand due to the influence of various external factors of the world market and natural conditions.

As the main conditions that ensure the success of the process of reducing differentiation

and levelling the volume of food consumption by the population in different regions, we can highlight:

– a maximum reduction of production costs, costs required for the development of spatial relations of different territories that are necessary for the implementation of the process of exchange of fruit and berry products, as well as losses associated with their movement;

– localising agricultural production in places with sufficient labour resources, land, and natural conditions favourable for this type of activity;

– minimising transport of products that lose their qualitative and quantitative characteristics as a result of these operations by locating their production close to the places of their consumption (provided that the cultivation process is not significantly dependent on the natural conditions);

– creating conditions for the free movement of fruit and berry products throughout the country;

– applying an integrated approach in the development of measures for the enhancement of production forces in order to improve the efficiency of the economy as a whole;

– levelling the possible negative impact of production, commercial, and consumer risks;

– applying effective tools to increase the country's food independence and security.

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Conflict of interest

The authors declare that there are no obvious and potential conflicts of interest related to the publication of this article.

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Пространственное развитие национального рынка плодов и ягод

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Предмет. Проблемы пространственного развития рынка плодов и ягод приобретают особую значимость вследствие нарастания асимметрии в развитии административно-территориальных единиц государства, усиления процессов глобализации при одновременной регионализации и интеграции рынков, которые не только вызывают изменения социально-экономических слагаемых, но и оказывают существенное влияние на развитие пространства, приводя к его трансформации.

Цели. Расширение теоретических положений пространственного развития рынка плодов и ягод. Определение тенденций пространственного развития российского плодово-ягодного рынка, позиционирование его субъектов. Разработка предложений по повышению результативности развития рынка фруктов и ягод в пространственном аспекте.

Методология. В процессе достижения поставленных целей использовались методы научного познания: диалектический; анализа, синтеза, сравнения. В процессе исследования изучены различные источники литературы: периодические издания, монографии, статистические сборники.

Выводы. Сделан вывод о пространственном развитии рынка фруктов и ягод как о совокупности изменений, обеспечивающих улучшение продовольственного обеспечения населения определенных территорий. В результате проведения исследования выявлено наличие значительной пространственной дифференциации как в производстве (предложении), так и в потреблении (спросе) фруктов и ягод. Теоретические и аналитические изыскания позволили сделать вывод о необходимости поддержки спроса (формирование спроса) и предложения (стимулирование производителей различных категорий) отечественного плодово-ягодного рынка.

Ключевые слова: плодово-ягодный рынок, пространственное развитие, Российская Федерация, федеральные округа, тенденции.

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