
SPATIAL FEATURES OF SECTORAL DEVELOPMENT

On the Road to Food Self-Sufficiency after 2014: Case Study of Kaliningrad Oblast

K. Yu. Voloshenko^{a, *}, K. A. Morachevskaya^{b, **}, A. A. Novikova^{c, ***},
E. A. Lyzhina^{d, ****}, and L. V. Kalinovskii^{e, *****}

^a Immanuel Kant Baltic Federal University, Kaliningrad, 236041 Russia

^b St. Petersburg State University, St. Petersburg, 199034 Russia

^c Kaliningrad State Technical University, Kaliningrad, 236022 Russia

^d Institute of Geography, Russian Academy of Sciences, Moscow, 119017 Russia

^e Russian Presidential Academy of National Economy and Public Administration, Moscow, 119571 Russia

*e-mail: KVoloshenko@kantiana.ru

**e-mail: k.morachevskaya@spbu.ru

***e-mail: anna.novikova@klgtu.ru

****e-mail: helen.lyzhina@gmail.com

*****e-mail: kalinovskiy-lv@ranepa.ru

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Abstract—Russia’s foreign trade relations in the 2010s developed in the face of various geopolitical challenges, which led to a radical transformation in the volume and geography of export–import operations. For the food sector, the key challenge was the food embargo of 2014, which, in turn, intensified import substitution policy in Russian agriculture and food production. The value of imports in the food market, the current level of development of agriculture and food production, the degree of diversification and localization of raw material relationships of enterprises acted as differentiating factors in the impact of new external challenges on the food self-sufficiency of regions. Kaliningrad oblast is of particular interest for studying the transformation of food self-sufficiency, given its exclave position, a low level of agricultural development a decade ago, and close export–import ties with European countries until 2014. The paper assesses food self-sufficiency, analyzes the corresponding territorial and sectoral shifts in agriculture and food production, and considers changes in the import component in the food market of Kaliningrad oblast. The study uses data from the Federal State Statistics Service, the Kaliningrad Oblast Customs Service, and the results of expert interviews and visual observations conducted by the authors in August 2020. It was revealed that transformation of the food self-sufficiency of Kaliningrad oblast, on the one hand, reflects all-Russian trends, and on the other, has unique features. The uniqueness is associated with the rapid growth of agriculture as a result of government support. In addition, there is a relatively dispersed distribution of key centers of agricultural production, atypical of many regions in mainland Russia. The beneficiaries of the free market niches that opened up after the 2014 food embargo, as in most of Russia, were large holdings, but many of them, in contrast to those located in the country’s interior, were quite acutely aware of breaks in raw material ties.

Keywords: food security, food embargo, food self-sufficiency, import substitution, Kaliningrad oblast

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INTRODUCTION AND FORMULATION OF THE PROBLEM

The geopolitical events of the 2010s—crisis events in Ukraine; the 2014 food embargo; periodic complications in Russian–Belarusian relations that caused the so-called Milk War—could not but affect the food markets of many Russian regions. The COVID-19 pandemic has become a new external challenge. With respect to food markets, this is of particular importance for border regions, where cross-border shopping trips were typical consumer behavior. Taking into

account the insufficiently high level of agricultural development in the region a decade ago, it is particularly interesting to study the transformation of food self-sufficiency in Kaliningrad oblast in the face of external challenges.

Separate attempts to assess food self-sufficiency and food security in Kaliningrad oblast as a whole were made earlier (Fedorov et al., 2019; Nikiforova, 2008; Zorina, 2018). One of the present authors helped to develop methods and algorithms for assessing the food security of the border region (Fedorov

et al., 2019). These studies claim that Kaliningrad oblast lags far behind the average values for the country as a whole and northwestern regions, in particular, in the main food security indicators, e.g., (Nikiforova, 2015). Food self-sufficiency of the region exists in only a few groups: grains, potatoes, fish, and fish products (Zorina, 2018).

The objective of this study is to assess the features and directions of transformation of Kaliningrad oblast's food self-sufficiency in the face of external challenges. The following questions are posed. What were the dynamics of different components making up Kaliningrad oblast's food self-sufficiency and what was the impact of new factors since 2014? How has agriculture and food production changed in the region in the face of external challenges? Who were the beneficiaries of the free niches that opened in the market and how was the territorial structure of production transformed?

THEORETICAL CONTEXT

For Russia's regions, issues of the legality of the use and content of "food self-sufficiency," as well as other related categories—food independence and food self-sufficiency—remain debatable. Their study is traditionally governed by the boundaries and level of development of modern theory and methodology for studying economic security of the region, including the provisions of food security (Fedorov et al., 2019).

The official interpretation of the term food security appeared in 1974 at the World Food Conference in Rome. Food security has been understood as the supply, at all times and throughout the world, of adequate basic foodstuffs in quantities sufficient to support a steady increase in food consumption and regulate fluctuations in production and prices. Since 1996, the main indicators of food security have been the population's physical and economic accessibility of food. In 2009, during the World Summit on Food Security, "social access" was additionally included in the concept, as a reflection of the topic of social inequality in the world.

In Russia, the term food security was introduced into the regulatory field only in 2010, although the first attempts were made as early as the 1990s. In 2010, the Food Security Doctrine was adopted by Decree of the President of the Russian Federation. Food security was interpreted as "the state of the country's economy, which ensures the food independence of the Russian Federation, guarantees the physical and economic accessibility for each citizen of the country of food products that meet the requirements of the Russian Federation legislation on technical regulation, in volumes not less than the rational norms of food con-

sumption necessary for an active and healthy lifestyle.¹ It should be noted that this definition, in contrast to the interpretations of food security by the United Nations Food and Agriculture Organization (FAO), is oriented towards solving the problem of a country's food self-sufficiency, and in assessing it, the problems of economic and physical accessibility of food are less important. Following the doctrine, the formation of normative legal documents on food security at the level of federal subjects began.

In 2020, in the Decree of the President On Approval of the Doctrine of Food Security of the Russian Federation² (hereinafter referred to as the Doctrine), changes were made to the definition of food security (in the new interpretation, defined as the state of the country's socioeconomic development, not as the state of the economy), the number of tasks to achieve food security was increased, as well as the number of risks and threats.

Food security is interpreted ambiguously not only at the national levels; in scientific studies, there has been no single approach. In the foreign literature, the interpretation is mainly based on the FAO definition (Leroy, 2015; Singh et al., 2014), although alternative approaches have been put forward. Thus, in (Upton et al., 2016), food security appears as a category of sustainability. Some researchers consider this concept in the context of "international (national) economic security." In (Shagaida and Uzun, 2015b; Trotsuk et al., 2018), the definition of food security correlates with the FAO interpretation; i.e., food security acts more as a social than an economic category.

The observed discrepancies in the study of food security issues at the country level give rise to even greater conceptual gaps when this category is considered with respect to regions. The concept of food security of the region is rarely used abroad. Analysis of regional food systems is much more common (Born and Purcell, 2006; Donald et al., 2010; Kneafsey, 2010; etc.). Studies on food security at the regional level of individual states, as a rule, affect developed countries and are carried out in the context of the need to exit global food chains in order to meet the food needs of the population (Hinrichs, 2013; Ostry and Morrisson, 2013). In developing countries, the context of assessing food security from the social side predominates, so households (Rooyen and Sigwele, 1998) and rural settlements (Graef et al., 2014) are the main objects of study.

¹ On Approval of the Doctrine of Food Security of the Russian Federation: Decree of the President of the Russian Federation no. 120 of January 30, 2010. Accessed from the legal reference system ConsultantPlus.

² On approval of the Food Security Doctrine of the Russian Federation: Decree of the President of the Russian Federation no. 20 of January 21, 2020. Accessed from the legal reference system ConsultantPlus.

In Russia, according to some authors, it is unacceptable to single out food security, food self-sufficiency, and food independence of the region as independent topics. The concept of food security of the region conflicts with the federal structure of the country vis-a-vis on its integrity, e.g., (Fedorov and Kurdyumov, 2013; Trotsuk et al., 2018; Visser et al., 2015; etc.). At the same time, the food self-sufficiency of the region can lead to loss of the economic advantages of the territorial division of labor (Zotov, 2006). Food self-sufficiency policy significantly overestimates the agricultural production potential of regions (e.g., territories of the Siberian Far North, the Far East, European Russia) or it does not take into account its absence altogether (Moscow and St. Petersburg) (Kornekova, 2015). Fedorov and Kurdyumov (2013) have proposed that food independence be defined only at the country level. In accordance with the Doctrine, food independence is the country's self-sufficiency with the main types of domestic agricultural products, raw materials, and food. The contribution of each region to achievement of Russia's food independence is governed by the level of its food self-sufficiency, which implies satisfaction of most of the population's needs for food by means of domestic production. Taking into account the level of food self-sufficiency and effectiveness of interregional relations within the country and implemented state policy directions in budgetary support for federal subjects, food self-sufficiency is being achieved.

Meanwhile, some researchers believe it justified to single out food security of the region due to the heterogeneous natural and climatic conditions of agricultural production; socioeconomic indicators; uneven population distribution; and remoteness from the center and donor regions of food products, borders, and transport routes (Vodyasov, 2018). At the same time, food security as a component of economic security for certain types of regions, e.g., those with a border position, acquires specific features and individual traits. At the level of border regions, it is necessary to take into account the differentiated impact of challenges and threats that vary along the Russian border, as well as differences in the potential and resources of regions, including those sufficient for food provision (Voloshenko, 2021).

As for Kaliningrad oblast, taking into account its exclave position, it is fundamental to assess its independence not only from foreign imports (FI), but also imports from other Russian regions (RI). Given the region's high transport component, food imports from Russian regions can significantly undermine its economic accessibility for the population. Accordingly, balanced food self-sufficiency of the region, FI, and RI are sources of food security.

Measuring and assessing food security, in particular, self-sufficiency, is most often done by the FAO methodology: measurements are carried out for more

than 40 indicators, combined into several groups: availability of products (level of production, volume of exports and imports, etc.); availability of food (economic possibility of acquiring food); stability of food supply (assessment of food supply in different time periods); food consumption (compliance of the level of consumption of food products with established standards) (Shagaida and Uzun, 2015a). According to the Doctrine, food security is assessed by analyzing achievement of threshold values of the target indicators (these include food independence, economic accessibility, physical accessibility, and compliance with the requirements of Eurasian Economic Union legislation on technical regulations). In addition to these categories, researchers suggest taking into account the quality and safety of products (Filippov, 2017), sustainability of the food system (Uskova et al., 2014), and the social accessibility of food (Vodyasov, 2018).

MATERIALS AND METHODS

The study was carried out in several stages.

At the first stage, the dynamics of two indicators was analyzed in relation to Russia's food independence as defined by the Doctrine in accordance with the contribution of each region: food self-sufficiency and economic accessibility of food.

When calculating in accordance with some of the most complex and controversial positions, the authors relied on their own earlier developments (Fedorov et al., 2019; Voloshenko, 2021), as well as the methodological provisions set forth in (Shagaida and Uzun, 2015a).

Food self-sufficiency is measured in terms of the ratio of the volume of local output of agricultural products, raw materials, and food to the volume of their domestic consumption. The level of achievement of the threshold values of the indicators established by the Doctrine is assessed: at least 95%, grain and potatoes; at least 90%, sugar, vegetable oil, milk and dairy products, vegetables, and melons; at least 85%, meat and meat products, fish and fish products, edible salt; at least 80%, seeds of the main agricultural crops of domestic selection; at least 60%, fruits and berries. As for regional food consumption, the following assumption is made: it tends towards or corresponds to the established average Russian level. The main problem in measurements is the debatable issue of taking into account FI and RI in domestic production; therefore, in this study, a formula is used to calculate the level of self-sufficiency in terms of the balance of food resources³:

³ Food balance sheets, 2007–2017 Rosstat. <https://rosstat.gov.ru/folder/11110/document/13277>. Accessed September 26, 2021; Food balance sheets, 2018, 2019. Rosstat. <https://rosstat.gov.ru/compendium/document/13278>. Accessed September 26, 2021.

$$S_{b,y} Pr + (FI + RI) = PC + L(FE + RE) PCF + S_{e,y}, \quad (1)$$

where $S_{b,y}$ and $S_{e,y}$ are food stocks at the beginning and end of the year, respectively; Pr is production for the period; FI is foreign imports; RI is regional imports; PC is productive consumption; L is losses; FE is foreign exports; RE is regional exports; PCF is the personal consumption fund.⁴

From formula (1), we obtain the ratio of own production, taking into account foreign exports and regional exports, to domestic consumption, which characterizes the level of food self-sufficiency in the region:

$$K_i^{FS} = \frac{Pr + (S_{b,y} - S_{e,y})}{(PCF + PC + L)} \times 100, \quad (2)$$

where K_i^{FS} is the level of food self-sufficiency for the i th product, %.

The food self-sufficiency of Kaliningrad oblast was assessed for the main commodity groups produced in the region. Therefore, the following types of products established by the Doctrine were not taken into account: sugar, vegetable oil, edible salt. Fish and fish products were also excluded from the analysis. First, Rosstat only approved the methodology for compiling the balance of fish and fish products in 2020, so statistical data for federal subjects⁵ are not currently available to the public. Second, the production of fish and fish products in Kaliningrad oblast for assessing food self-sufficiency can be considered excessive (production of more than 300 000 t/yr with personal consumption at a level of 20 000 t/yr).⁶ Products are mainly exported to Russian regions and sent abroad for export only when the internal needs of the region itself are satisfied. The study did not estimate the share of seeds of the main agricultural crops of domestic selection due to the lack of publicly available statistical data. Additionally, egg production is considered, which is widely represented in the region and has been actively developed in recent years.

The *economic accessibility* of food is estimated as the ratio of the actual consumption of the main food products per capita to the rational norms of its consumption that meet the requirements of a healthy diet. The calculations used recommendations on rational

food consumption standards developed in 2016 by the Ministry of Health of the Russian Federation, taking into account changes made in 2020.⁷ Rational consumption rates are the average per capita values of the main food groups ensuring consumption of substances and energy, as well as the variety of food consumed. Since food consumption in Kaliningrad oblast as a whole is not determined by ethnic characteristics or natural and climatic conditions for the survival of the population, the average Russian level can be used. In addition, due to the lack of developed and approved rational norms at the level of federal subjects, domestic researchers are forced to rely on the average Russian level (Shagaida and Uzun, 2015b).

When studying the economic accessibility of food, the level of household income and food prices are usually taken into account. In accordance with the methodology described in (Shagaida and Uzun, 2015b), the authors assessed the degree of satisfaction of consumption by the regional population of basic food products. The ratio of the cost of food sets based on rational standards to the actual expenditures of the population for their consumption was analyzed. For a ratio less than 100%, a situation is recorded when the level of income or prices do not allow for consumption according to rational norms.

At the second stage, the spatiotemporal dynamics of agriculture and food production in Kaliningrad oblast in the period after 2014 were assessed. It was important not only to record the dynamics of the main indicators, but also to establish how the territorial and partially organizational structure of production changed in the new conditions and how the results of import substitution policy affected the food security of the region.

The data sources were official statistical data, as well as materials collected during field research by the authors in August 2020. Then, expert interviews were conducted with representatives of the Kaliningrad scientific community, local administrations of border municipalities, and a number of small agricultural and food producers (cheese, vegetables, and berries) (18 interviews). The expert interviews covered such topics as changes in the export and raw material relations of enterprises, the dynamics of specific market segments (prices, assortment, competition), the impact of the 2014 food embargo and the COVID-19 pandemic, and the features of state support for agriculture and food production. In addition, visual surveys of outlets in Kaliningrad and other settlements of the region served as an indirect source of data. The range of dairy, meat and fruit and vegetable products was fixed in stores of various types.

⁷ Order of the Ministry of Health of the Russian Federation no. 614 of August 19, 2016 On Approval of the Recommendations on Rational Norms for the Consumption of Food Products that Meet Modern Requirements for a Healthy Diet. Accessed from the legal reference system ConsultantPlus.

⁴ There is no personal consumption for grain and legumes; use of grain and its processing products for processing into products are estimated.

⁵ Order of the Federal State Statistics Service (Rosstat) of the Ministry of Economic Development of Russia no. 389 of July 16, 2020 On Approval of the Methodology for Compiling the Balance of Fish and Fish Products to Determine the Average Per Capita Level of Their Consumption. <https://rosstat.gov.ru/storage/mediabank/hZfgYRzC/met-balans.pdf>. Accessed March 5, 2022.

⁶ "Fishery Complex of Kaliningrad Oblast" (under of the State Program of Kaliningrad Oblast "Development of the Fishery Complex for 2014–2019, stage 1"): analytical note. Kaliningrad: Kaliningradstat, 2020.

Table 1. Level of food independence of Kaliningrad oblast, %

| Production | Doctrine standard | Year | | | | | | |
|--|-------------------|-------|-------|-------|-------|-------|-------|-------|
| | | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
| Cereals and leguminous crops | 95 | 161.3 | 202.4 | 260.7 | 201.9 | 155.2 | 211.7 | 187.8 |
| Potato | 95 | 86.7 | 88.1 | 92.7 | 95.5 | 95.8 | 97.3 | 102.7 |
| Milk and dairy products | 90 | 58.1 | 54.7 | 75.0 | 75.5 | 74.4 | 76.1 | 76.1 |
| Meat (including offal) and meat products | 85 | 57.2 | 57.5 | 64.1 | 65.9 | 70.8 | 75.1 | 87.2 |
| Vegetables and gourds | 90 | 53.2 | 53.9 | 61.3 | 63.5 | 55.9 | 66.0 | 66.4 |
| Fruits and berries | 60 | 25.0 | 30.6 | 35.6 | 46.3 | 46.9 | 48.1 | 52.6 |
| Eggs | — | 69.1 | 63.0 | 70.5 | 73.9 | 79.9 | 85.4 | 79.9 |

Source. Authors' calculations.

At the third stage, the dynamics of the main food import trade flows to Kaliningrad oblast was assessed, taking into account the volume and geography of supplies. The data of the Kaliningrad Oblast Customs Services were also used.

RESULTS

Based on the results of the study, it can be said that the food self-sufficiency of the region is increasing over the entire studied interval after 2014 (Table 1). The standard level is fixed for grain, legumes, and potatoes; at the end of 2019, for meat and meat products, and a fairly high level is observed for eggs.

Despite growth by almost 1.3 and 2 times in the provision of milk and dairy products, as well as fruits and berries for the specified period, respectively, the food self-sufficiency standard has not yet been reached. The most import-dependent sectors of the food market did not overcome the consequences of the 2014 embargo. The average for 2013–2019 food self-sufficiency grew by 3–7% per year, the largest changes are seen in the category of fruits and berries, where the average growth over the period was almost 115%.

In measuring the economic accessibility of food, the difference between the consumption indicators according to the food balance sheets (FBS) and the sample household budget survey (HBS) was taken into account (Table 2). In FBS, food consumption is slightly higher than according to HBS; however, the estimates coincide in terms of achieving rational consumption norms. The exception is the consumption of potatoes and eggs: based on the HBS, rational norms have not been achieved, but according to FBS, they have. In general, the region has a high level of food consumption, except for milk and dairy products, vegetables and melons, and fruits and berries. At the same time, according to the HBS data, for most food items after 2014, there was a decrease in consumption with respect to rational norms, and its recovery has been noted only in the last 2 years. The level of self-sufficiency was influenced not only by the restrictions on

food imports introduced since 2014, but also by the overall change in household income. This is explained by the high import dependence of the economy of Kaliningrad oblast, which during the subsequent period (from 2016 to 2019) was characterized by a decrease in real disposable incomes.

In the studied time interval, an additional assessment was made for the ratio of the cost of the actually consumed set of products to the rational set based on the standards recommended by the Ministry of Health of the Russian Federation. For each year, the cost of a set of products is determined by multiplying the recommended (rational) norms for consumption of products by their current prices⁸; Rosstat data on the actual annual food expenditures by the population were also used⁹ (Table 3). Over the entire time interval, the indicator is below 100%. This indicates that, on average, a resident of the region, in terms of the amount of existing food expenses, was unable to provide consumption according to rational standards.

However, the indicator also a positive dynamics, which testifies to a real increase in consumption in terms of income generated by the population and prices established in the market. Thus, the reduction in food consumption in the region is due not so much to the physical restriction of food imports (including imports from regions), but to a decrease in disposable incomes.

This trend, which is typical of the country as a whole, is complicated by regional specifics. The changed institutional conditions had a strong impact on the economy of the region, and, consequently, on generation of income: in 2016, a 10-year transition period ended, in which the regimes of the Special Economic Zone-2006 (SEZ-2006) and Special Economic Zone-1996 (SEZ-1996) were active and cus-

⁸ EMISS: Average consumer prices (tariffs) for goods and services. <https://www.fedstat.ru/indicator/31448>. Accessed September 29, 2021.

⁹ Rosstat: Income, expenditure, and consumption of households. <https://rosstat.gov.ru/folder/11110/document/13271>. Accessed September 9, 2021.

Table 2. Level of achievement of rational norms of food consumption, %

| Food | Year | | | | | | | | | | | | | |
|-------------------------|------|-----|------|-----|------|-----|------|-----|------|-----|------|-----|------|-----|
| | 2013 | | 2014 | | 2015 | | 2016 | | 2017 | | 2018 | | 2019 | |
| | HBS | FBS | HBS | FBS | HBS | FBS | HBS | FBS | BS | FBS | HBS | FBS | HBS | FBS |
| Milk and dairy products | 90 | 82 | 92 | 86 | 84 | 70 | 85 | 70 | 80 | 69 | 75 | 69 | 76 | 68 |
| Sugar | 140 | 179 | 138 | 179 | 130 | 183 | 128 | 188 | 119 | 188 | 118 | 188 | 122 | 188 |
| Potato | 86 | 124 | 88 | 126 | 83 | 127 | 83 | 120 | 81 | 119 | 77 | 119 | 73 | 108 |
| Vegetable oil | 114 | 109 | 112 | 111 | 113 | 113 | 98 | 115 | 96 | 117 | 91 | 118 | 91 | 119 |
| Meat and meat products | 148 | 130 | 152 | 126 | 143 | 121 | 139 | 121 | 136 | 122 | 131 | 119 | 131 | 119 |
| Vegetables and gourds | 80 | 83 | 81 | 82 | 79 | 77 | 78 | 76 | 68 | 75 | 69 | 79 | 69 | 76 |
| Fruits and berries | 84 | 81 | 83 | 75 | 71 | 65 | 63 | 68 | 58 | 65 | 57 | 68 | 68 | 69 |
| Bread products | 100 | 110 | 105 | 110 | 103 | 111 | 98 | 110 | 95 | 110 | 93 | 111 | 94 | 113 |
| Eggs | 95 | 107 | 96 | 108 | 93 | 109 | 91 | 107 | 92 | 108 | 93 | 111 | 103 | 110 |

Note. HBS, Sample Household Budgets Survey; FBS, food balance sheets.

Source. Calculated by authors from Rosstat and EMISS data (Consumption of basic food products by population of Kaliningrad oblast in 2015–2019: Stat. Digest, Kaliningrad: Kaliningradstat, 2020; Consumption of basic food products by population of Kaliningrad oblast in 2014–2018: Stat. Digest, Kaliningrad: Kaliningradstat, 2019).

toms privileges for the import and export of products were retained. After 2016, a small number of enterprises, mainly from among large regional producers, took advantage of customs benefits. This situation is confirmed by the dynamics of foreign import, foreign export, and regional export of products. As a result, in the context of ongoing geopolitical and institutional changes, the incomes of a significant part of the population have decreased and food consumption has begun to decline.

It seems important to analyze how these changes correlate with the transformational processes in the development of agriculture and food production in the region. Most of Kaliningrad oblast in the studied period was characterized by a steadily positive dynamics in agricultural production (Fig. 1). The territorial structure of agriculture has remained relatively uniform, in contrast to the pattern typical of many regions of European Russia in which one or two suburban municipalities clearly dominate.

The area under cultivation in the region increased by 49% between 2013 and 2019. Let us take a closer look at the sectors affected by the food embargo. Wide opportunities for import substitution were opened in

the production of vegetables, fruits, and berries. The gross harvest of vegetables in 2013–2019 increased by 20% (from 63 000 to 76 000 t). Several municipalities in which large greenhouse complexes appeared were responsible for such growth (Fig. 2). Significant successes were also achieved by the Gvardeysky municipal okrug¹⁰ (MO). The largest volumes came from several market players, in particular, Orbita-Agro LLC (which appeared in 2006).

In almost all municipalities of Kaliningrad oblast, in the period from 2013 to 2019, the gross harvest of fruits and berries increased by more than 50%. For Kaliningrad, this figure increased by 4.5 times. The Guryevsky, Chernyakhovsky, Krasnoznamensky, and Bagrationovsky MOs and Svetlogorsky urban okrug (UO) also held leading positions (Fig. 3). Since 2015, the annual increase in fruit and berry plantations in the region has been about 250 ha. Such rates can be called nearly galloping, but the demand for products has not yet been covered (which is quite understandable given the time required, e.g., for the growth of apple and other fruit trees). In addition, cultivation of apples is mainly concentrated on farms. In the berry sector, large holdings play a more significant role (e.g., the aforementioned Orbita-Agro LLC).

Significant changes have also taken place in animal husbandry. In 2013, 40% of dairy products delivered to the food market of Kaliningrad oblast were imported from foreign countries, and about 30% came from local producers (Zorina, 2018). The volume of milk production as a whole in the region increased in 2013–2019 by 24% (from 148.8 to 184.9 thous. t; for comparison, over the previous 5-year period, the growth was

Table 3. Level of actual consumption of products vs. rational set, %

| Indicator | Year | | | | | | |
|--|------|------|------|------|------|------|------|
| | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
| Ratio of cost of actually consumed set of products to rational set | 77.5 | 74.9 | 78.9 | 79.1 | 79.1 | 79.2 | 80.6 |

Source. Calculated by authors from EMISS and Rosstat data.

¹⁰Hereinafter the municipal status of areas is specified as of 2022.

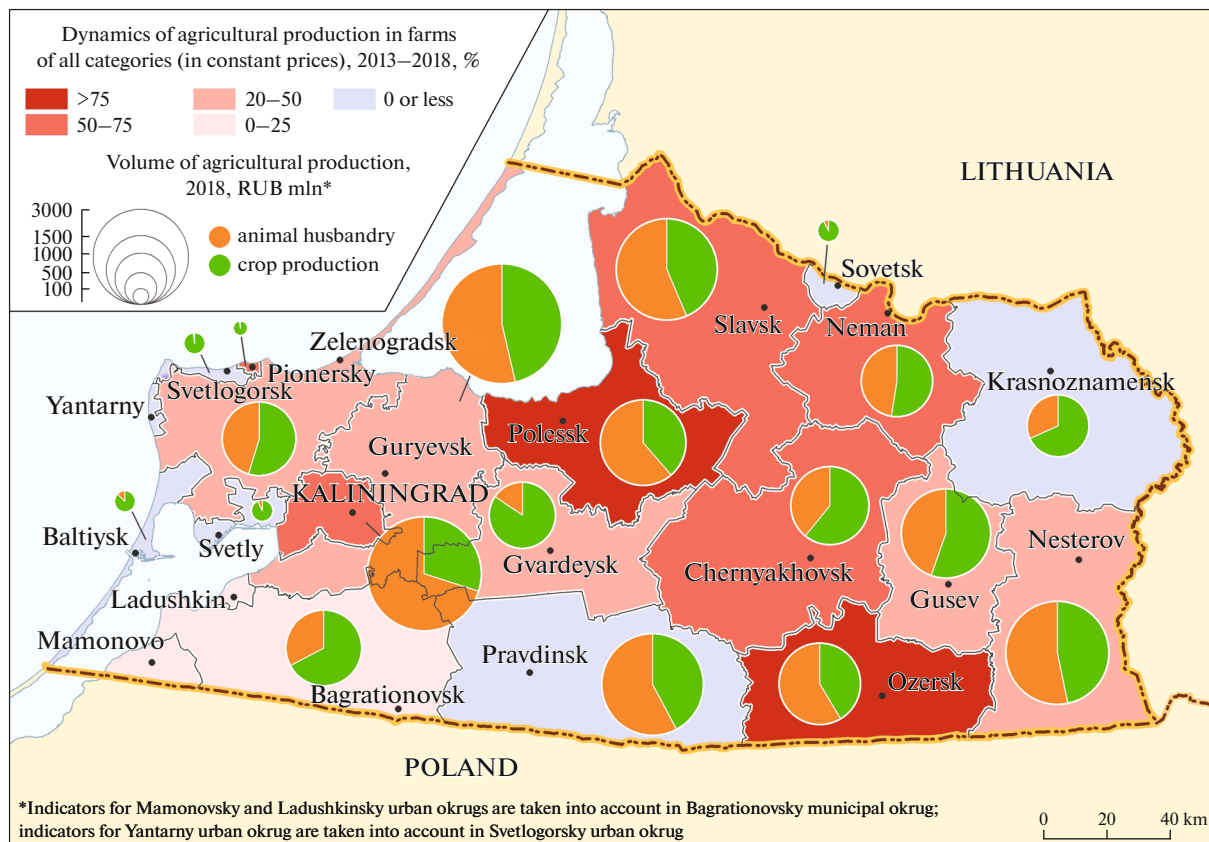


Fig. 1. Dynamics of agricultural production in 2013–2018.

Source: compiled by authors according to Database of Indicators for Municipalities.

only 3.8%). The share of agricultural organizations in the total volume of production increased quite significantly—by 10% (up to 59%). In the period before the food embargo, milk yield per cow in agricultural organizations was a modest 5444 kg. By 2019, this figure had grown to 7771 kg. This is still far from the highly productive farms of “mainland” Russia, but the growth that occurred can be called rapid. Such successes are associated with an increase in cattle breeding stock in the region, which was actively supported by the regional authorities as part of the countrywide import substitution policy. In recent years, a large agroindustrial holding (AIH) Zalesye opened a highly specialized breeding and genetic center for dairy cattle breeding.

On the “milk map,” the greatest success is seen in the Polessky MO, associated with activities of the Zalesye AIH, which provides a full cycle, from milk production to processing (Fig. 4). Now the enterprise produces more than 50% of milk in the region. The volumes of milk production also increased significantly in the Slavsky MO (Malinovka LLC, Novoe Vysokovskoe LLC, also included in the Zalesye AIH) and the Nesterovsky MO (Dairy factory LLC as part of the DolgovGroup agricultural holding; Yasnoe JSC as part of Agroscandia Holding), although in 2013 they

were leaders in the region. Thus, as in other regions of Russia, as indicated by previous studies (Morachevskaya et al., 2020; Shagaida and Uzun, 2015a), the beneficiaries of the import substitution policy are the largest market players, who are concentrating ever-larger production volumes.

Meat production in the period from 2013 to 2019 increased by 85% (from 50.3 to 93.4 thous. t) (Fig. 5). Pig and poultry farming developed the most rapidly. The success of pig farming is mainly due to the activities of the Danish company RBPI Group (Russia Baltic Pork Invest AS), one of the top 10 pork producers in Russia. In the poultry industry, production volumes were increased by poultry farms belonging to the DolgovGroup Agroholding and the Produkty Pitania Group of Companies, which are also well-known large companies in the region. In addition, Kaliningrad oblast is being actively developed by Miratorg AIH (LLC Kaliningrad Meat Company). However, grown cattle are slaughtered in Bryansk oblast, so this is not taken into account in the regional statistics of meat production and, more importantly, does not reduce the cost of beef for the population of the Russian exclave.

Unlike agriculture, which is actively supported from the regional and federal budgets, negative

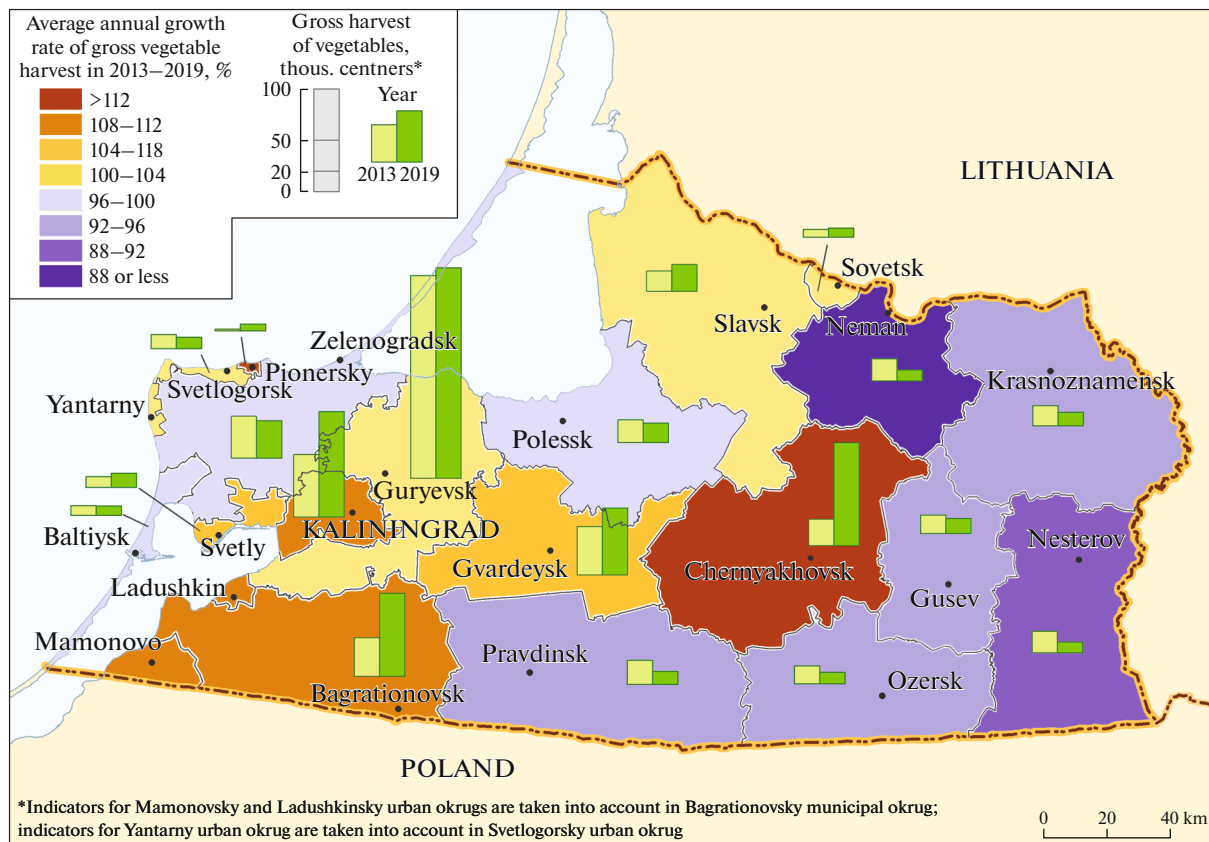


Fig. 2. Dynamics of gross harvest of vegetables in 2013–2019.

Source: compiled by the authors according to Database of Indicators for Municipalities.

changes can be seen in food production (Table 4). Thus, sausage production decreased by 40%, primarily due to the shortage of raw materials stemming from the ban on its import. For example, Siberian Delicacy Kaliningrad and Chernyakhovsky Meat Processing Plant ceased to exist. A visual inspection of retail outlets in different settlements of Kaliningrad oblast confirmed that individual manufacturers still retained their positions in the market. One of them is Almak. After a change of owner in 2017, sausage production significantly expanded the range of products, including elite varieties (prosciutto, bresaola, etc.).

Dairy products production held a more favorable position. In the course of semistructured interviews with the population, satisfaction was mainly noted with the range of locally produced whole-milk products, although in fact there was a decline in production. Among the most commonly mentioned brands was Zalessky Farmer. Despite the fact that cheese production increased in the region (from 8.4 to 13.2 thous. t in 2013–2019), many residents negatively assess the quality of both regional and other analogs that appeared on store shelves. The most positive ratings at the same time sound like “satisfactory,” “normal,” and “tolerable.” Most likely, we are talking about the description of mass-market products. At the

same time, a significant number of so-called artisanal cheese factories appeared in Kaliningrad oblast, the products of which are comparable in quality and assortment to their “sanctioned” counterparts (before the fall of the ruble, however, prices were incomparable). The most famous example is the Tilsit-Ragnit cheese factory in the city of Neman. Other small industries include Shaakendorf (Guryevsky MO), Sobolev Cheese, Koenigskaese, Cheesarium (all three from Kaliningrad), Branden (Gusevsky UO), Insterburg (Chernyakhovsky MO), etc. During expert interviews with the heads of cheese factories, it turned out that external factors significantly influenced the appearance of enterprises and their development strategy—the opening of new product niches in 2014—but the current state and problems are primarily influenced by domestic factors, a decrease in purchasing power. It is no coincidence that many of the mentioned cheese dairies focus on the tourism component of the business (excursions to the enterprise, tastings, master classes, opening of restaurants), since it is difficult to achieve profitability solely by selling the cheese produced.

The market of dairy and meat products was also quickly filled with goods from Belarus, which is con-

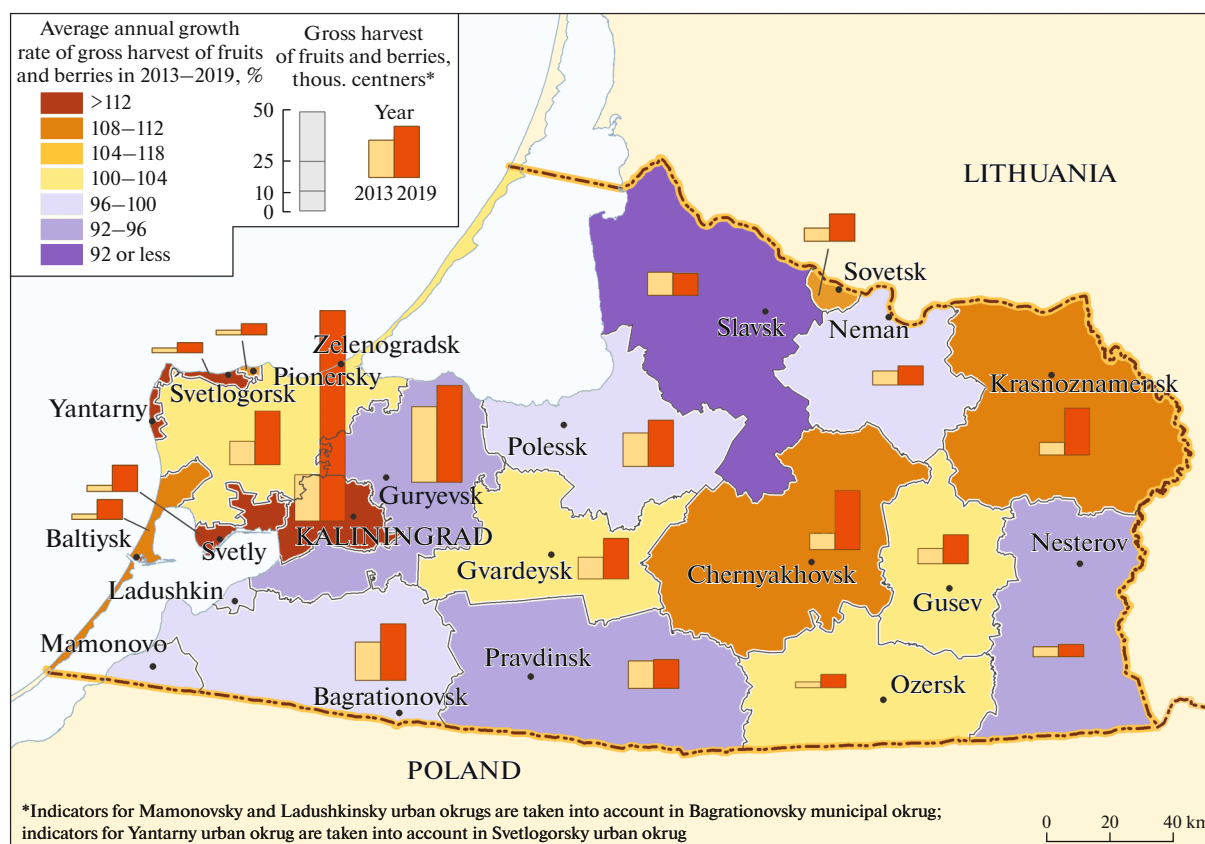


Fig. 3. Dynamics of gross harvest of fruits and berries in 2013–2019.
 Source: compiled by authors according to Database of Indicators for Municipalities.

Table 4. Dynamics of food production in 2013–2019

| Food | Year | | | | | | |
|--|-------|-------|-------|-------|-------|-------|-------|
| | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
| Meat and by-products, total, thous. t | 33.8 | 43.4 | 46 | 48.5 | 47.7 | 20.5 | 16.5 |
| Sausages, thous. t | 118.5 | 91.8 | 76.3 | 70.1 | 53.3 | 54.6 | 54.5 |
| Whole milk products, thous. t | 75.9 | 73.2 | 44.5 | 45.6 | 48.7 | 45.2 | 40 |
| Cheese and cottage cheese, thous. t | 8.4 | 10.6 | 11.4 | 14.1 | 15.5 | 12.7 | 13.2 |
| Butter and butter pastes, thous. t | 1.3 | 1.5 | 1.7 | 1.6 | 1.9 | 2 | 2 |
| Confectionery, thous. t | 39 | 55.7 | 52.6 | 45.3 | 31.8 | 21.6 | 24.9 |
| Bread and bakery products, thous. t | 52.1 | 52.8 | 53.7 | 54.8 | 51.1 | 49.9 | 50.1 |
| Fish and fish products, processed and canned, thous. t | 370.3 | 357.3 | 363 | 341.5 | 369.7 | 370.9 | 354.7 |
| Canned fish, total, mln cans | 177.1 | 183.7 | 209.2 | 176.6 | 175.6 | 180.5 | 157.7 |
| Frozen fish, thous. t | 185.5 | 175.2 | 197.1 | 182.7 | n/d | 228.1 | 218.7 |

Source: compiled by authors based on data from Rosstat regional statistical yearbooks.

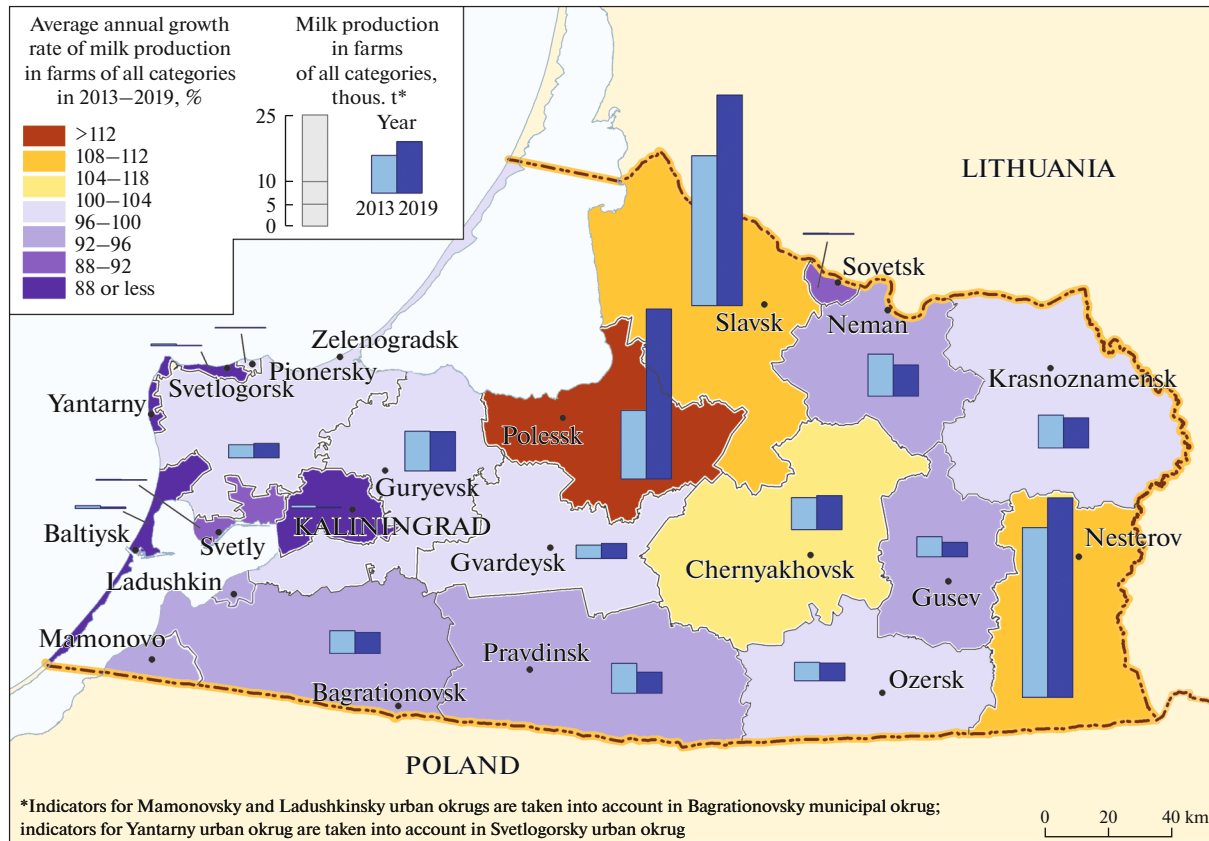


Fig. 4. Dynamics of milk production in 2013–2019.

Source: compiled by authors according to Database of Indicators for Municipalities.

firmed both by expert interviews and the authors' own visual assessments.

The dynamics of food self-sufficiency is especially interesting versus transformational shifts in export–import operations. In this direction, Kaliningrad oblast differs significantly from the all-Russian trends both in the share of food in the total volume of foreign trade and the dynamics of its change in 2013–2019 (Fig. 6).

The indicators for Kaliningrad oblast are similar in direction to the all-Russian only with respect to the share of exports, but here the order of the data is significantly different. Thus, food in the region's exports increased from 28 to 79.6% by 2019. A level close to 79% has been stable over the past 3 years. The share of food in the region's imports also increased from 18 to 24% in 2019. In 2020, food in the region's total imports was already 30%.

More revealing are the changes in the volume of import operations for individual commodity items. For 2013–2019, imports of dairy products decreased by 3.8 times; meat and meat by-products, by 3.4 times; and vegetables, by 2.6 times. There have been obvious shifts in the geography of deliveries: the share of CIS countries has increased from 3 to 16%, while the share

of non-CIS countries has correspondingly decreased (largely at the expense of neighboring Poland and Lithuania).

CONCLUSIONS

The study confirms the hypothesis that the 2014 food embargo was fundamentally important from the viewpoint of increased food self-sufficiency in Kaliningrad oblast. Active state support measures for the agriculture and food production made it possible to increase the production of agricultural products and their processing, primarily in positions in which the region was the least provided for: vegetables, fruits and berries, milk and dairy products, and meat and meat products. However, the basic low level of development of the agriculture and food production in the region prevented it from reaching the self-sufficiency thresholds for most of the “sanctioned” industries, with the exception of meat production (meat processing also dropped significantly). Whereas progress in agriculture was significant, regional food production, the raw materials of which went beyond the borders of the region, could not maintain their previous positions (primarily due to a reduction in imports of meat and powdered milk).

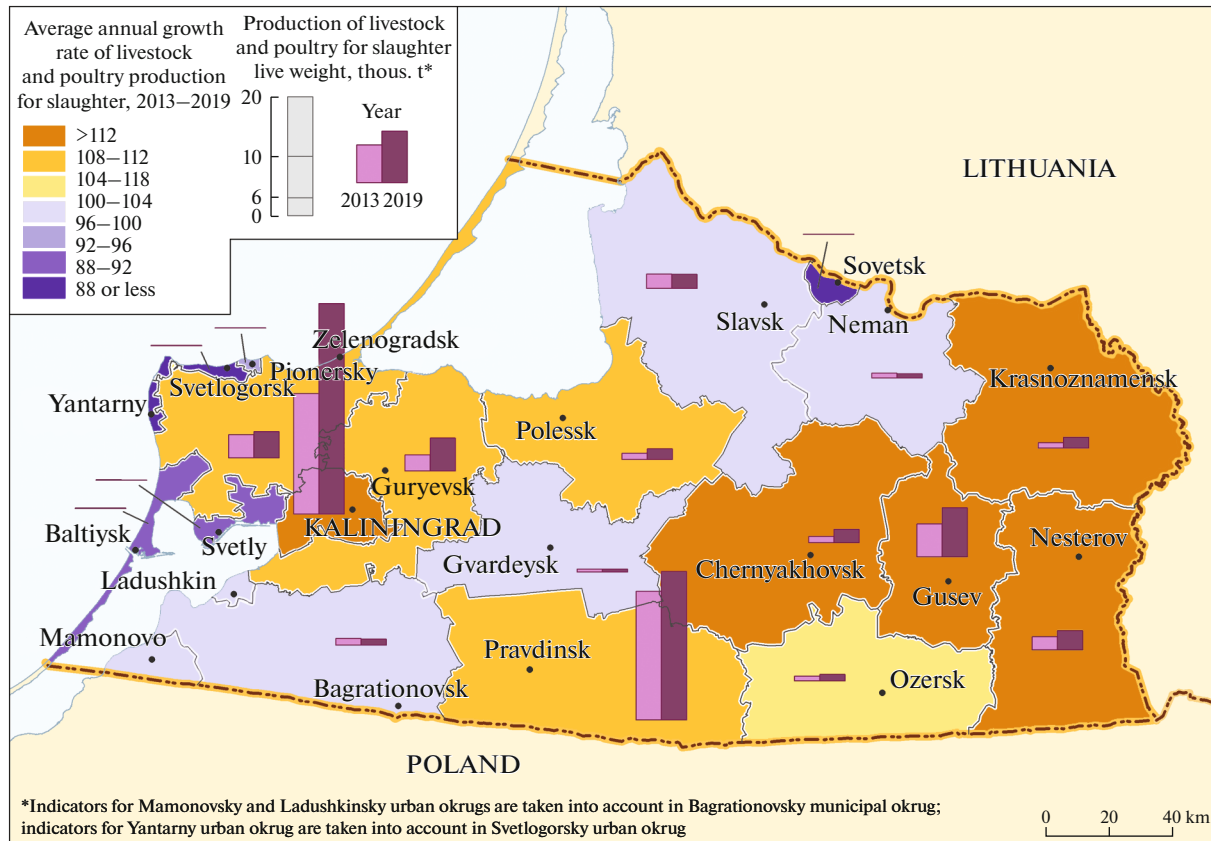


Fig. 5. Dynamics of livestock and poultry production for slaughter in 2013–2019.
 Source: compiled by the authors according to Database of Indicators for Municipalities.

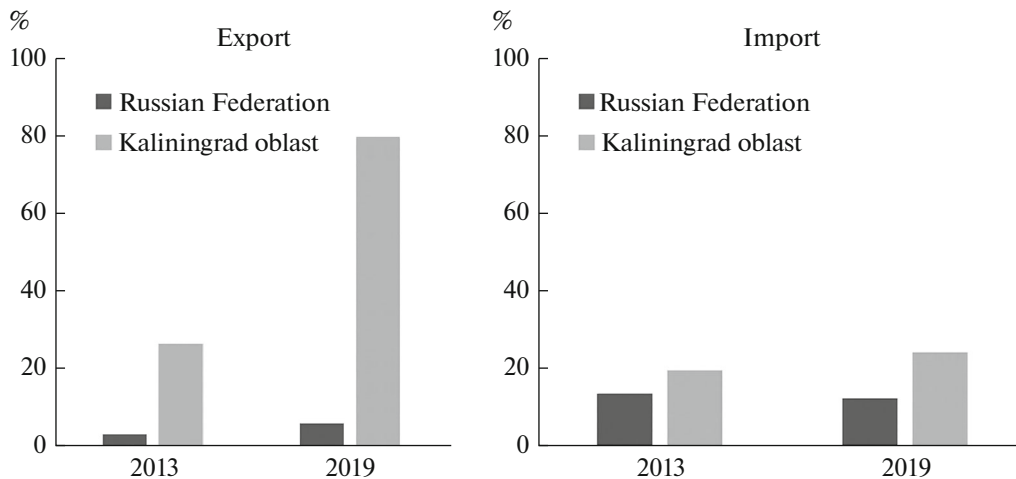


Fig. 6. Share of foodstuffs in exports and imports of Russian Federation and Kaliningrad oblast.
 Source: calculated by authors based on Rosstat and EMISS data (Foreign Trade of Kaliningrad oblast, Commodity structure of export and import of the region. <https://koblt.customs.gov.ru/statistic/vneshnyaya-torgovlya-kaliningradskoj-oblasti>. Accessed October 23, 2021; Russian Federation export and import by goods, Commodity structure of export. <https://customs.gov.ru/folder/519>. Accessed October 23, 2021; Russian Federation export and import by goods, Commodity structure of import. <https://customs.gov.ru/folder/521>. Accessed October 24, 2021.

A significant number of new agroindustrial enterprises did not appear in the period after 2014, meanwhile, the growth of most of the existing large producers of agricultural products and food did take place. Large market players have concentrated various forms of financial support from the state. This, however, is not a feature peculiar to Kaliningrad oblast and is characteristic of most Russian regions.

The territorial structure of agricultural production underwent changes due to the emergence of new centers (inclusion in the zone of influence of agricultural holdings) in contrast to the contraction effect characteristic of many federal subjects. This is determined both the configuration of the territory of Kaliningrad oblast, the peculiarities of its transport network, the distribution of the land fund, the influence of the coastal position, and local institutional features.

As a result of the institutional transformations taking place in Kaliningrad oblast with respect to the SEZ regime, the regional production conditions changed significantly. Imports decreased and restrictions appeared on the export of finished products to the rest of Russia in connection with the abrogation of customs privileges. In the geography of import deliveries, the positions of CIS countries, primarily Belarus, have significantly increased.

Due to the difficult geopolitical situation after 2014 and changes in 2016, the economic accessibility of food decreased in the region. As a result, after 2014, food consumption decreased and was consistently below the established rational norms. Growth in consumption recovered only in the last 2 years.

The transformation of food self-sufficiency in Kaliningrad oblast in the face of external challenges of the 2010s, on the one hand, reflected countrywide trends, and on the other, had unique features. The latter include the rapid growth of agriculture with a high return on state support and the relatively dispersed distribution of key production centers, which together contributed significantly to the growth in food self-sufficiency in Kaliningrad oblast. The trend towards a decrease in the economic accessibility of food is typical of most of Russia; however, the region's exclave position during crisis years made it more sensitive to the situation in the economy. As a result, the purchasing power of the regional population has declined.

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CONFLICT OF INTEREST

The authors declare that they have no conflicts of interest.

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