Russia’s Food Security as a Component of the state’s Economic Security: Import Substitution in the Federal Districts of the Russian Federation

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Abstract. Purpose: The purpose of the study is to develop proposals for improving food security in Russia as a component of economic security, based on indicators of the import-substituting food potential of the federal districts of the Russian Federation.

Design/Methodology/Approach: To highlight the regions that provide 80% of the national food security of Russia, it is worth considering in more detail the indicators of import-substituting food potential for the regions of the Russian Federation. The average indicators of import-substituting food potential in the federal districts of the Russian Federation for 2015–2018 are considered. Using the ranked method, the data is presented more clearly. After ranking using the methodology Olgarenko and Ugryumova (Ugryumova and Olgarenko, Nat. Interests Priorities Secur. 16:6–8, 2015) the contribution of each region to the import-substituting food potential of the country was assessed. The federal districts were grouped according to the degree of their contribution to import substitution of the Russian Federation using the ABC analysis method.

Findings: The Central Federal District, the North Caucasus Federal District, the Southern Federal District have a great influence on the development of food security in Russia as a whole. When considering measures to improve food security in Russia, one should focus on the leading regions. This is due to the greater return on the implementation of measures.

Originality/Value: Improving the sustainability of food security from internal and external threats can be achieved through the institutionalization of the system of its provision, which includes organizational, information and legal, scientific and technological, personnel, financial, land and other resource components at different levels of the economy. This approach is especially important when food security is correlated with indicators of demographic security.

Keywords: Food security · Economic security · Demographic security · Agro-industrial complex · Institutionalization · Public administration · Regional economy
1 Introduction

An important point to ensure a high quality of life for the population is to ensure the food security of the Russian Federation, as a component of the economic security of the state. The main direction in this case is the policy of import substitution in terms of state and regional management (Ugnich et al. 2020). This is due to the situation on the world market: the imposition of sanctions by a number of states against Russia. The end of 2019 – the beginning of 2020 was marked by the onset of the global crisis, which could also negatively affect the country's food security, as well as the implementation of the import substitution policy.

Russian scientists were involved in food security issues: Altukhov (2008), Glazyev (2020), Ilyina and et al. (2014), Kiselev (2017), Maslennikova (1998), Miloserdov (2008), Nazarenko (2000), Paptsov (2009), Serkov et al. (2015) and others.

To develop proposals to improve food security in Russia, as a component of economic security, using the example of federal districts, let us consider the indicators of import-substituting food potential in the regions of the Russian Federation.

2 Materials and Method

To highlight the regions that provide 80% of the national food security of Russia, it is worth considering in more detail the indicators of import-substituting food potential for the regions of the Russian Federation. Consider the change in the five selected indicators for 2015–2018 by regions of the Russian Federation (Table 1).

Table 1. Average indicators of import-substituting food potential by regions of the Russian Federation, 2015–2018

| Federal districts of the Russian Federation | Agricultural products, million rubles | Sown area of agricultural crops thousand ha | Investments in fixed assets for agriculture, hunting and forestry, million rubles | Export of food products and agricultural raw materials | Import food goods and agricultural raw materials |
|--------------------------------------------|-------------------------------------|-------------------------------------------|--------------------------------------------------------------------------------|-------------------------------------------------|-----------------------------------------------|
| Central Federal District (CFD)             | 1014094.38                          | 14719.59                                  | 188631.30                                                                       | 6575.00                                         | 16147.10                                      |
| Northwestern Federal District (NWFD)      | 185007.25                           | 1456.73                                   | 48614.90                                                                        | 3415.70                                         | 7881.70                                       |

(continued)
More clearly the available data, using the rank method, can be visualized in Table 2.

| Federal districts of the Russian Federation | Agricultural products, million rubles | Sown area of agricultural crops thousand ha | Investments in fixed assets for agriculture, hunting and forestry, million rubles | Export of food products and agricultural raw materials | Import food goods and agricultural raw materials |
|-------------------------------------------|-------------------------------------|--------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------|------------------------------------------------|
| Southern Federal District (Southern FD)  | 658818.63                           | 11888.47                                   | 54084.00                                                                          | 8410.40                                             | 2889.30                                             |
| North Caucasus Federal District (NCFD)   | 327484.25                           | 4172.48                                    | 24534.80                                                                          | 353.80                                               | 140.00                                               |
| Volga Federal District (VFD)             | 927457.75                           | 23529.82                                   | 78501.70                                                                          | 1218.80                                              | 753.40                                               |
| Ural Federal District (UFD)              | 248094.00                           | 5220.03                                    | 23324.80                                                                          | 249.20                                               | 295.40                                               |
| Siberian Federal District (Siberian FD)  | 446059.38                           | 14527.94                                   | 40672.80                                                                          | 915.80                                               | 513.20                                               |
| Far Eastern Federal District (FEFD)      | 155199.88                           | 2076.80                                    | 29019.70                                                                          | 3781.90                                              | 1116.20                                              |

Source: Federal State Statistics Service Federal State Statistics Service, 2020).

Table 1. (continued)
After ranking using the methodology developed by G.V. Olgarenko, A.A. Ugryumova, it is possible to assess the contribution of each region to the country’s import-substituting food potential (Ugryumova and Olgarenko 2015).

| Federal districts of the Russian Federation | Agricultural products, million rubles | Sown area of agricultural crops thousand ha | Investments in fixed assets for agriculture, hunting and forestry, million rubles | Export of food products and agricultural raw materials | Import food goods and agricultural raw materials |
|--------------------------------------------|--------------------------------------|--------------------------------------------|-----------------------------------------------------------------|-------------------------------------------------|-------------------------------------------------|
| Central Federal District (CFD)             | 1                                    | 2                                          | 1                                                                | 2                                               | 1                                               |
| Northwestern Federal District (NWFD)       | 7                                    | 8                                          | 4                                                                | 4                                               | 2                                               |
| Southern Federal District (Southern FD)     | 3                                    | 4                                          | 3                                                                | 1                                               | 3                                               |
| North Caucasus Federal District (NCFD)      | 5                                    | 6                                          | 7                                                                | 7                                               | 8                                               |
| Volga Federal District (VFD)               | 2                                    | 1                                          | 2                                                                | 5                                               | 5                                               |
| Ural Federal District (UFD)                | 6                                    | 5                                          | 8                                                                | 8                                               | 7                                               |
| Siberian Federal District (Siberian FD)     | 4                                    | 3                                          | 5                                                                | 6                                               | 6                                               |
| Far Eastern Federal District (FEFD)         | 8                                    | 7                                          | 6                                                                | 3                                               | 4                                               |

Source: Federal State Statistics Service (Federal State Statistics Service, 2020).
The technique includes the following stages (Ugryumova and Olgarenko 2015):

1. calculation of consolidated import substitution indices for federal districts of the Russian Federation according to Table 1.
2. determination of the $J_i$ index by the formula 1. Determination of the position of the region among others for each indicator.

$$J_i = \frac{k_i - k_{\text{min}}}{k_{\text{max}} - k_{\text{min}}} \times 100\%$$

$k_i$ – the actual value of the indicator of the studied region;
$k_{\text{min}}$ – the highest value of the indicator of regions in the federal district (hereinafter – FD);
$k_{\text{max}}$ – the lowest value of the indicator of regions in the federal district.

3. calculation of summary indices of import substitution by federal districts (Table 3).

| Federal districts of the Russian Federation | Agricultural production index, % | Index of assessment of sown area of agricultural crops, % | Index of an estimation of Investments in a fixed capital of an agricultural, hunting and forestry, % | Index for assessing the export of food products and agricultural raw materials, % | Index of assessment of imports of food products and agricultural raw materials, % |
|-------------------------------------------|----------------------------------|----------------------------------------------------------|---------------------------------------------------------------|---------------------------------------------------------------|---------------------------------------------------------------|
| Central Federal District (CFD)           | 0.00                             | 37.92                                                    | 0.00                                                         | 22.49                                                         | 0.00                                                          |
| Northwestern Federal District (NWFD)     | 96.61                            | 100.00                                                   | 84.70                                                        | 61.20                                                         | 51.64                                                         |
| Southern Federal District (Southern FD)   | 40.13                            | 50.13                                                    | 81.39                                                        | 0.00                                                          | 82.82                                                         |
| North Caucasus Federal District (NCFD)   | 79.36                            | 86.81                                                    | 99.27                                                        | 98.72                                                         | 100.00                                                        |
| Volga Federal District (VFD)             | 13.95                            | 0.00                                                     | 66.62                                                        | 88.12                                                         | 96.17                                                         |

(continued)
4. calculation of the generalized indicator of food import substitution of the region (ISFPI) for each FD (k - FO number) (Formula 2):

$$\text{ISFPI}_k = \frac{1}{5} \cdot \left( \sum_{i=1}^{5} J_i \right)$$

(2)

ISFPI$_k$ – import substitution food potential index; 
k-th region

The given index of import-substituting food potential (R ISFPI$_k$) (Formula 3):

$$\text{ПрППИР}_k = \frac{\text{ППИР}_k}{\sum_{k=1}^{8} \text{ППИР}_k},$$

(3)

5. using the ABC analysis method, the federal districts are grouped according to the degree of contribution to import substitution (Table 4).

### Table 3. (continued)

| Federal districts of the Russian Federation | Agricultural production index, % | Index of assessment of sown area of agricultural crops, % | Index of an estimation of Investments in a fixed capital of an agricultural, hunting and forestry, % | Index for assessing the export of food products and agricultural raw materials, % | Index of assessment of imports of food products and agricultural raw materials, % |
|-------------------------------------------|---------------------------------|-------------------------------------------------------|-------------------------------------------------------|-------------------------------------------------------|-------------------------------------------------------|
| Ural Federal District (UFD)              | 89.68                           | 83.30                                                  | 100.00                                                | 100.00                                                | 99.03                                                |
| Siberian Federal District (Siberian FD)  | 69.30                           | 41.79                                                  | 89.51                                                 | 91.83                                                 | 97.67                                                 |
| Far Eastern Federal District (FEFD)      | 100.00                          | 95.88                                                  | 96.55                                                 | 56.71                                                 | 93.90                                                 |

Source: Federal State Statistics Service (Federal State Statistics Service, 2020).
From the data in Table 4, it is obvious that the Central Federal District, the North Caucasus Federal District, and the Southern Federal District have a great influence on the development of food security in Russia as a whole (Zmiyak et al. 2020). When considering measures to improve food security in Russia, one should focus on the leading regions. This is due to the greater “return” from the implementation of measures.

| Federal districts of the Russian Federation | Region food import substitution rate | The given index of import substituting food potential | The given index of indicators of food imports cumulative | Food Import Index Group |
|------------------------------------------|-------------------------------------|-----------------------------------------------------|--------------------------------------------------------|-------------------------|
| Central Federal District (CFD)           | 12.08                               | 0.02                                                | 0.02                                                   | A                       |
| Northwestern Federal District (NWFD)     | 78.83                               | 0.14                                                | 0.17                                                   | A                       |
| Southern Federal District (Southern FD)  | 50.90                               | 0.09                                                | 0.26                                                   | A                       |
| North Caucasus Federal District (NCFD)   | 92.83                               | 0.17                                                | 0.43                                                   | B                       |
| Volga Federal District (VFD)             | 52.97                               | 0.10                                                | 0.52                                                   | B                       |
| Ural Federal District (UFD)              | 94.40                               | 0.17                                                | 0.70                                                   | B                       |
| Siberian Federal District (Siberian FD)   | 78.02                               | 0.14                                                | 0.84                                                   | C                       |
| Far Eastern Federal District (FEFD)       | 88.61                               | 0.16                                                | 1.00                                                   | C                       |

Source: Federal State Statistics Service (2020).
3 Results

To carry out an import substitution strategy, it is necessary to take into account financial stability at the regional level (Ugnich 2013), the main indicator of which is GRP.

Consider the change in GRP by federal districts (Fig. 1).

![Graph showing the dynamics of GRP by federal districts, 2014-2019, billion rubles (Main socio-economic indicators of the regions of the North Caucasus Federal District 2018)](image)

In general, the dynamics of the GRP indicator for all regions (federal districts) has a positive trend. The GRP in the Russian Federation also shows a significant increase in this indicator. It should be noted that the largest growth in comparison with 2017 falls on 2018 (10,099.99 billion rubles). GRP indicator for 2019 – 93189.88 billion rubles.
As part of the development of proposals for improving food security in Russia, it is worth considering the main threat at the moment - the developing world crisis. That, unconditionally, in the opinion of most analysts, will affect the decline in GDP.

Considering that the trends in income and expenses in the regions grew relatively proportionally in the period 2013–2019. (Fig. 2,3), respectively, in the context of restrictions, this trend will negatively reflect on regional indicators.

With the COVID-19 coronavirus pandemic, there is a growing risk of food security, especially in countries that depend on food imports. According to FAO (Food and Agriculture Organization) experts, one of the manifestations of food security risk in terms of investment will be increased credit risks and tightening credit policies in developing countries, which cannot provide large-scale macroeconomic support programs. Demand for selected food items could fall due to increased uncertainty and heightened safeguards. Changes in the diet are also likely - a reduction in the consumption of meat and other high-value foods such as vegetables and fruits. If we look at the crisis in terms of falling oil prices, then low prices and falling global demand will...
also reduce the growth of the domestic economy. According to the Center for Macroeconomic Analysis and Short-Term Forecasting for the next two years of recession, Russia may lose 3% of GDP under the optimistic scenario: 2.3–2.5% in 2020 and 0.5–0.8% in 2021.

In 2019, GDP amounted to 110,046.1 billion rubles. Decrease in GDP in 2020 may reach the level of 107294.9 billion rubles. At the same time, the volume of agriculture, forestry, hunting, fishing and fish farming may also decrease to the level of 3699.8 billion rubles. As part of maintaining the country's internal food security, on April 28, 2020, Russia suspended grain exports until July 1, 2020. The temporary suspension of grain exports from Russia will not affect the total volume of supplies of products and will not lead to stagnation of agricultural enterprises, since grain has already been contracted and shipments under the previously concluded agreements continue. These restrictions will help meet the increased domestic demand and limit the growth of grain prices on the domestic market. Spring field work in 2020 began as planned. It can be expected that the grain harvest at the end of the year will not be lower than the level of
2019. According to Rosstat, the grain harvest in Russia in 2019 amounted to 121.2 million tons, including 74.4 million tons of wheat.

It is also worth considering separately one of the directions in the implementation of the import substitution policy during the crisis - loans at a low interest rate for the development of agriculture on a par with grants and subsidies for farmers. Lending to agricultural enterprises is based on the Rules for the provision of subsidies approved by the Resolution of 2016.

At the same time, more than 80% of enterprises cannot afford the presented loans due to the lack of a positive credit history and sufficient collateral.

According to the Ministry of Agriculture of the Russian Federation, 319.5 billion rubles are provided in the federal budget in 2020 to support the Russian agro-industrial complex under state programs. Against 318.2 billion rubles. in 2019 Including 283.6 billion rubles. Will be allocated for the state program for the development of agriculture, 35.9 billion rubles. For the integrated development of rural areas. The bulk of this amount will go to concessional lending to enterprises. The largest share of funds (32%) in 2020 is provided for concessional lending (90.9 billion rubles). 22% will be directed to interbudgetary transfers, including a “compensating” subsidy 34.2 billion rubles, and a “stimulating” subsidy 27.1 billion rubles. 12% of the allocated money, or 33.8 billion rubles, will go to support the export of agricultural products, 30.2 billion rubles will be allocated for investment credits (loans). But the amount allocated for the technical modernization of the industry will decrease: from 19.5 billion rubles. in 2018 to 1.1 billion rubles. From 5.4 billion rubles. up to 3.8. The amount of support for the federal program “Creation of a support system for farming and the development of rural cooperation” will decrease. By 5.1 billion rubles. Less funds will be allocated for the development of agricultural exports.

In 2019, the volume of the agricultural insurance market exceeded 5.3 billion rubles. This takes into account the data on the volume of premiums on insurance with state support for the year in the amount of 4.3 billion rubles. Also, a premium for agricultural insurance under contracts that were concluded in the first 9 months. Without subsidies – 983 billion rubles. The insurance premium increased by 2.3 rubles. Compared to 2018.

In 2019, under the conditions of state support, 4.8 million hectares of sown and planting areas were insured in the country, as well as the livestock of farm animals in the amount of 6.7 million conventional heads (compared to 2018, the increase was 315% and 49%, respectively).

At the same time, it can be noted that it is advisable to implement the above measures, first of all, in the Central Federal District. This is due to the fact that this district has a priority development of agricultural potential.

When forecasting the state of the Russian economy for 2020, it can be noted that under the existing conditions of a crisis situation, by maintaining optimal prices in the domestic market and financial support for economic entities, it is possible to maintain food security at a sufficient level.

The weakening of the criteria for obtaining concessional lending, as well as the rates on it, for agricultural enterprises is one area for ensuring food security. At the same time, concessional lending includes investment and short-term loans. It is also possible to increase the maximum loan amount that can be provided to one borrower in
each region of Russia. This will allow farmers to continue their activities at the same level.

_Hypothesis_

The dynamics of the average per capita income of the population of the federal districts (Fig. 4) is growing. However, according to the Institute for Social Analysis and Forecasting, 48.6% of the structure of expenditures of low-income families is spent on the consumer basket (data from Rosstat for 2018). At the same time, it is noted that “the peculiarity of Russia is the atypical, in comparison with other countries, groups at risk of poverty - families with children and the working poor. In total, at the end of 2018, 18.4 million people, or 12.6% of the population, lived below the poverty line (including children”).

![Dynamics of the average per capita income of the population of the federal districts, billion rubles (Main socio-economic indicators of the regions of the North Caucasus Federal District 2018)](image)

Accordingly, taking into account the topic of import substitution research under consideration, let us check the dependence of the share of poor households with children under the age of 16 in the total number of poor households on imports of agricultural raw materials and food (million dollars). We use the initial data for this (Table 5).
In Fig. 5. Shows the dependence “The share of low-income households with children under the age of 16 in the total number of low-income households” from “Import of agricultural raw materials and food”.

![Graph showing relationship between share of poor households with children under 16 (18) years of age and import of agricultural raw materials and food.](image)

**Fig. 5.** Dependence “The share of poor households with children under the age of 16 (18) in the total number of poor households” from “Import of agricultural raw materials and food”.

In Fig. 6. R² = 0.5267 - the coefficient of determination from the regression equation demonstrates the following. 52.6% of the variation of the item “Share of low-income households with children under 16 (18) years old in the total number of poor households” is due to the variation of the item “Import of agricultural raw materials and food”. 47.4% of the variation is associated with the impact of other unaccounted for factors.

**Table. 5.** Initial data.

| Year | Share of poor households with children under 16 (18) years of age in the total number of poor households | Import of agricultural raw materials and food, USD million |
|------|------------------------------------------------------------------------------------------------------|----------------------------------------------------------|
| 2017 | 81                                                                                                   | 28931                                                    |
| 2016 | 78.8                                                                                                | 25058                                                    |
| 2015 | 77.7                                                                                                | 26650                                                    |

Source: [23.24]
4 Conclusion

The temporary suspension of grain exports from Russia will not affect the total volume of supplies of products and will not lead to stagnation of agricultural enterprises, since the grain has already been contracted and shipments under the previously concluded agreements continue. These restrictions will help meet the increased domestic demand and limit the growth of grain prices on the domestic market. Spring field work in 2020 began as planned. It can be expected that the grain harvest at the end of the year will not be lower than the level of 2019. According to Rosstat, the grain harvest in Russia in 2019 amounted to 121.2 million tons, including 74.4 million tons of wheat.

The weakening of the criteria for obtaining concessional loans for agricultural enterprises is one of the areas of ensuring the country's food security. Support to domestic producers, stabilization of prices on the domestic market for food products, implementation of agro-industrial work on time, government support for agricultural enterprises will help reduce the consequences of the international crisis.

The main directions of ensuring the country's food security: ensuring the physical availability of food for all segments of the population, increasing the scientific potential, improving the mechanisms for regulating the food market, as well as ensuring the full physiological needs of the population for all groups.

The bulk of the sanctions against the Russian Federation were introduced in mid-March 2014. As a result of their introduction, access to the global food market was limited for Russia. A number of sanctions were introduced against large enterprises in the country. All this had an extremely negative impact on the activities of agricultural enterprises. Thanks to the beginning of the import substitution policy (food embargo), the active development of the production of domestic products began, which, in turn, ensured the country's food security today. It also accelerated export growth and reduced the difference between export and import flows.

A sufficient amount of high-quality import-substituting food potential in terms of ensuring food security contributes to the qualitative development and existence of the
population of the regions of the Russian Federation, taking into account their primary needs and ensuring a full-fledged systemic diet, as well as achieving related tasks, the implementation of which is aimed at ensuring the economic security of the state as a whole.

Improving the sustainability of food security from internal and external threats can be achieved through the institutionalization of the system of its provision, which includes organizational, information and legal, scientific and technological, personnel, financial, land and other resource components at different levels of the economy. This approach is especially important when food security is correlated with indicators of demographic security. Namely, the fact that half of the expenses of poor families with children go to food.

The current global crisis also necessitates state support for agricultural enterprises (in particular, agricultural enterprises), which suffered losses due to a decrease in market share due to sanctions, but in which they can be participants. Accordingly, within the framework of improving the provision of food security in Russia, it is possible to propose the introduction of a number of preferential loans for agricultural enterprises, and a reduction in rates for concluding agricultural insurance contracts with state support.

Further research should be aimed at developing a policy of state regulation of support for the agro-industrial complex to ensure a possible reduction in the share of expenditures on the consumer basket in the structure of expenditures of low-income families.

References

Altukhov, A.I.: AIC development strategy is the main condition for the implementation of a national agri-food policy (2008). https://cyberleninka.ru/article/n/strategiya-razvitiya-apk-glavnoe-uslovie-realizatsii-natsionalnoy-agroprodovolstvennoy-politiki-1. Access 12 May 2020

Ilyina, Z.M., Shpak, A.P.: Criteria and indicators of food security (2014). https://cyberleninka.ru/article/n/kriterii-i-indikatory-prodovolstvennoy-bezopasnosti. Access 12 May 2020

Glazyev, S.Yu.: Report on the underlying causes of growing chaos and measures to overcome the economic crisis (2020)

Kiselev, S.V.: Growth factors and ensuring sustainable dynamics of agricultural exports (2017). https://cyberleninka.ru/article/n/faktory-rosta-i-obespecheniya-ustoichivoy-dinamiki-eksporta-produktsii-apk. Access 12 May 2020

Bogatyrev, A.N., Maslennikova, O.A.: Structural reorganization of the scientific and technical potential of the Russian agro-industrial complex – the basis of innovation policy (1995). https://cyberleninka.ru/article/n/strukturnaya-reorganizatsiya-nauchno-tehnicheskogo-potentsiala-apk-rossii-osnova-innovatsionnoy-politiki. Access 12 May 2020

Maslennikova, O.A.: Organizational and economic mechanism for managing innovative processes in the food industry of the agro-industrial complex (1998). https://www.dissercat.com/content/organizatsionno-ekonomicheskii-mekhanizm-upravleniya-innovatsionnymi-protsessami-v-pishchevy. Access 12 May 2020

Miloserdov, V.V.: Food complex: problems and solutions (2008). https://cyberleninka.ru/article/n/prodovolstvennyy-kompleks-problemy-i-puti-resheniya. Access 12 May 2020
Nazarenko, V.I.: Development of foreign economic relations of the regional agro-industrial complex in a transitive economy: based on materials from the Stavropol Territory (2000). https://www.dissercat.com/content/razvitie-vneshneekonomicheskikh-svyazei-regionalnogo-apk-v-usloviyah-tranzitivnoi-ekonomiki. Access 12 May 2020

Paptsov, A.G.: Features of information support of agribusiness abroad. Agribusiness Econ. Manage. (3), 84–87 (2009)

Serkov, A.I., Drokin, V.V., Zhuravlev, A.S.: Food security and import substitution are the main strategic objectives of modern agricultural policy (2015). https://cyberleninka.ru/article/n/prodovolstvennaya-bezopasnost-i-importozameschenie-osnovnye-strategicheskie-zadachi-sovremennoy-agrarnoy-politiki. Access 12 May 2020

Ugnich, E., Taranov, P., Zmiyak, S.: The third mission of a regional flagship university: the first results of its realization. In: Institute of Scientific Communications Conference, pp. 705–713. Springer, Cham (2019). https://doi.org/10.1007/978-3-030-29586-8_82

Ugnich, E.A.: The perfection of the mechanism of venture capital financing: organizational and economic model. World Appl. Sci. J. 26(12), 1584–1587 (2013)

Ugryumova, A.A., Olgarenko, D.G.: Problems and prospects of food import substitution in the regions of the Russian Federation. Nat. Interests Priorities Secur. 16(301), 6–8 (2015)

Federal State Statistics Service: Federal State Statistics Service (2020). https://www.gks.ru. Access 12 May 2020

Main socio-economic indicators of the regions of the North Caucasus Federal District: Statistical collection. Bulletin. Rosstat, Moscow (2018)

Zmiyak, S.S., Ugnich, E.A., Taranov, P.M.: Development of a regional innovation ecosystem: the role of a pillar university. In: Growth Poles of the Global Economy: Emergence, Changes and Future Perspectives, pp. 567–576. Springer, Cham (2020). https://doi.org/10.1007/978-3-030-15160-7_57