

The food security concept as the state support basis for agriculture

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Abstract. The article discusses the problem of the country (territory) food security formation and its relationship with the state support size for agriculture. The work purpose is to determine the features of the food security formation in the Samara region and the relationship with the state support size for agricultural production in the region. Within this study framework, it is necessary to solve the following tasks: - study the features of the food security concept and its application in the Samara region conditions; - the optimal parameters of the region's self-sufficiency determination in food products; - establishing a link between food security and the optimal amount of state support for the agro-industrial complex. Taking into account only the data on the region self-sufficiency, the region produces a sufficient amount of potatoes and vegetables. Comparing these indicators with rational consumption rates, it can be seen that the residents' demand for agricultural products is provided mainly by potatoes, the consumption of which is 1.5 times higher than the rational. The subsidies existing system in the Samara region is not optimal from the point of view for ensuring food security, which indicates either the underfunding of the production for both these and other product groups. In 2017–2018 the amount of state support, based on the above calculations, had to be increased by at least 100–500 million rubles.

Key words: criterion, food security, PSE, self-sufficiency, subsidies.

INTRODUCTION

Food security is an essential element of the economic security of a country, region or other strictly limited area. It is formed due to the country (region) ability to provide the required amount of the state (limited territory) population needs in agricultural products in amounts that allow for rational life. In order to ensure an optimal level of life for the region population, the state must provide such a set of food products, which, on the one hand, is sufficient in composition and quantity to fulfill this task, and on the other hand, corresponds to the peculiarities of the inhabitants national composition, takes into account the natural and climatic properties of the territory, i.e. has the ability to adapt to these parameters (Zhichkin et al., 2019; Bryukhovetskaya et al., 2020; Glushchenko et al., 2020). The territory food security functional combines the actual (physical and economic) provision of agricultural products, as well as its security (Naidanova & Polyanskaya, 2017; Lakomiak & Zhichkin, 2019; Khayrzoda et al., 2020). These parameters should be guaranteed at all levels of the region's government in full through the establishment of quantitative values (standards). The list of these indicators should include: the optimal rate of food consumption, the subsistence minimum, indicators of the quality of life, guaranteed prices, etc. At the same time, it is necessary to consider the fact that the degree of food security and its quantitative assessment is influenced by many interdependent factors, the ratio of which varies across territories:

- the actual income of the population and the quality of life in certain territories;
- the nutrients imbalance presence in the territory population due to national, climatic and other factors (Ripoll-Bosch et al., 2013; Falcone et al., 2019);
- insufficient implementation of control mechanisms for the agricultural products quality or their insufficient level (Michalk et al., 2019; Morkovkin et al., 2020; Rasva & Jürgenson, 2020);
- the risky nature of the territory natural conditions as a result of which there are significant fluctuations in domestic agricultural production (Herrero et al., 2013);
- a significant share of imported agricultural products (Trotsuk et al., 2018; Pismennaya et al., 2019);
- the foreign policy situation and its impact on the possibility of purchasing food outside the territory (sanctions and counter-sanctions) (Yen et al., 2008; Nieto & Reyes, 2019; Gibadullin et al., 2020).

MATERIALS AND METHODS

The work purpose is to determine the features of the food security formation in the Samara region and the relationship with the state support size for agricultural production in the region. Within this study framework, it is necessary to solve the following tasks: - study the features of the food security concept and its application in the Samara region conditions; - determination of the region's self-sufficiency optimal parameters in food products; - establishing a link between food security and the state support optimal amount for the agro-industrial complex. Elements of the food security modern concept are shown in Fig. 1. Taking into account the territorial boundaries of application, the food security following levels are distinguished: - international; - country; - regional; - territorial; - individual (Fedotova et al., 2018; Abramov et al., 2020).

When implementing this technique, food security at various levels (state, subject, territory) is closely interrelated. These interconnections are very close, since they are controlled by means of life quality uniform standards for the entire state as a whole and each specific subject separately. Ensuring these standards is a fundamental function of public administration at government all levels. It is implemented through a system of equalizing the individual regions income through the organizational measures system and support for subsidized regions.

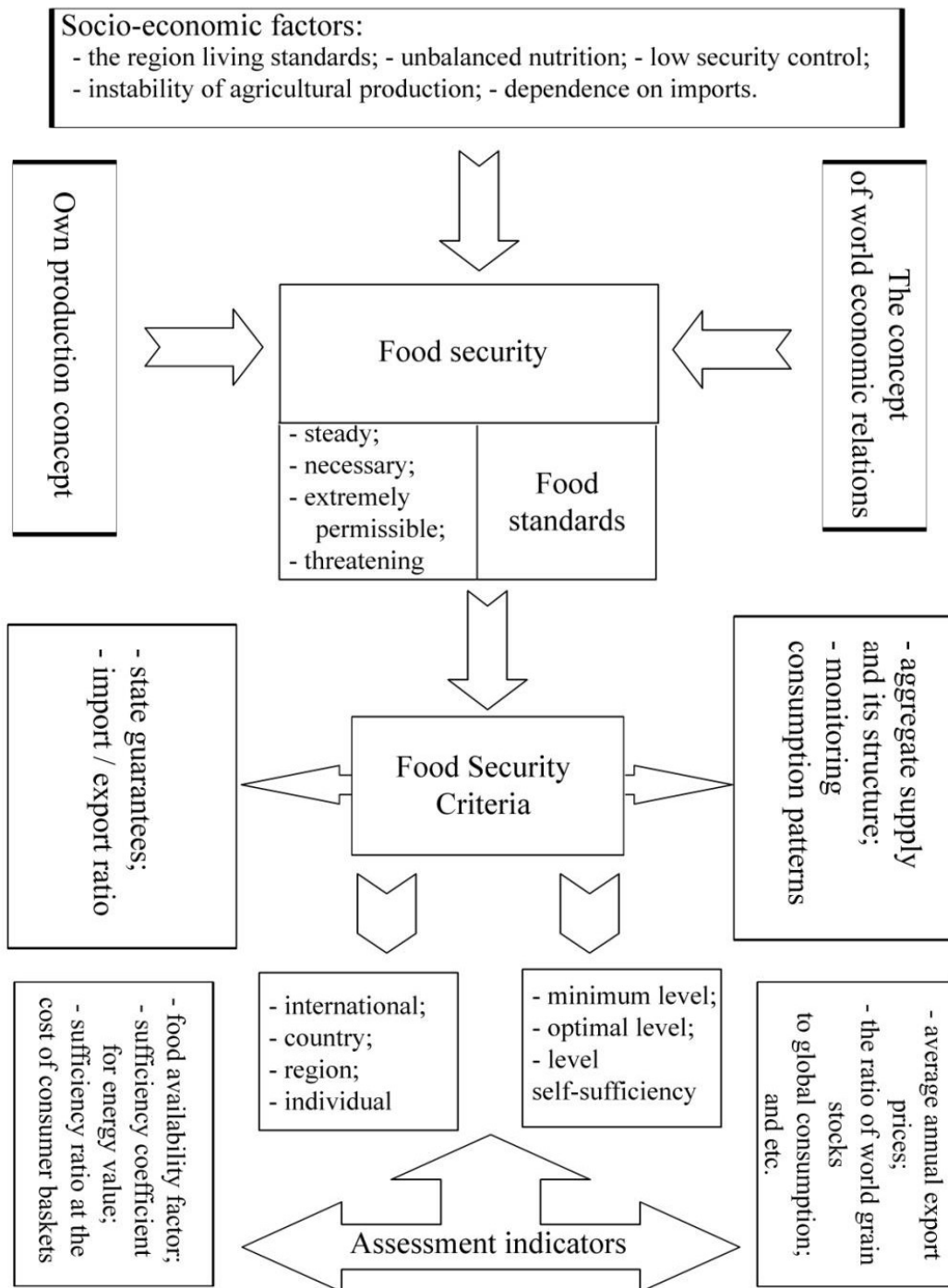


Figure 1. Food Security Concept System.

At the same time, it is also influenced by the ability of the region itself to form a income certain level, described through indicators: income per 1 inhabitant, the food prices level, etc.

Abstract-logical and statistical methods were used in the study. In particular, we used absolute, relative and average values. The research results are presented in tabular and graphical forms.

RESULTS AND DISCUSSION

When planning the food security of the territory, it is proposed to take into account a number of indicators that form the region's self-sufficiency in agricultural products: the dynamics of the region's population size and demographic characteristics; the food resources structure and volume in the region; the local agricultural production size; environmental factors of agricultural production; food export and import policies of federal and regional authorities (Shagaida & Uzun, 2015). Additionally, the level of the region self-sufficiency with food products can be estimated on the basis of the regional coefficient of agricultural products' production - the consumption. It shows how much agricultural products of a given type are produced per inhabitant.

$$I = \frac{(P + Z_1 - Z_2 - V)}{Ch \cdot Norm} \quad (1)$$

where I – regional coefficient of agricultural products' production - consumption; P – the amount of food product i produced in the region during the period t ; Z_1 and Z_2 I carryover quantity of food product i on the territory of the region at the beginning and end of period t ; V – export of food product i outside the region during period t ; Ch – the actual population of the estimated area during the period t ; $Norm$ – the legislatively enshrined norm of food rational consumption taking into account climatic, national and other characteristics of the region population consumption.

The values of this indicator can be explained as follows: $I > 1.1$ - this type of food is available for the population of the region, but its consumption is higher than rational (due to the relatively low price, consumer habits of residents, etc.), therefore, there is a violation of the consumption optimal structure; $1.1 > I > 1.0$ - the product is available to the population, the consumption structure is optimal; $1.0 > I > 0.8$ - the product is practically available to the residents of the region, but for some reason, consumption is somewhat lower than rational; $0.8 > I > 0.5$ - the food product is limitedly available to the residents of the region, there are problems with its consumption; $I < 0.5$ - significant problems with the availability of this product, violation of the optimal structure of consumption in the region, search for replacement products (Bukhtoyarov et al., 2020).

Analyzing the data of the Samara region (Figs 2, 3), it can be seen that the region produces a sufficient amount of potatoes and vegetables. Potatoes belong to the first group, the provision for which is complete, but leads to a violation of the consumption optimal structure, since it displaces other food groups from the diet. Vegetables belong to the third group - there is an almost complete supply of needs. But for meat and milk (belonging to the fifth group), one can clearly see the failure of self-sufficiency and a high degree of dependence on the food products delivery. At the same time, there is a constant growth in the consumption of meat, milk, vegetables.

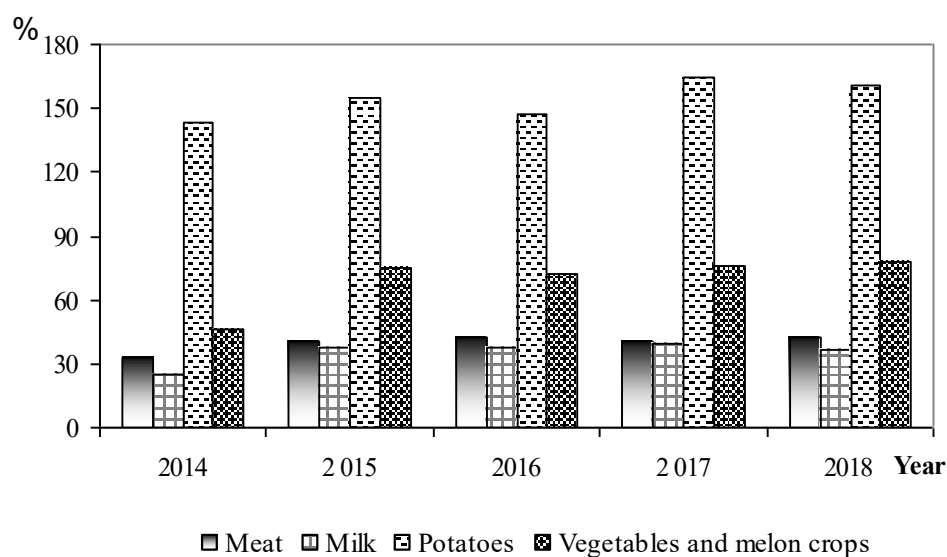


Figure 2. The coefficient of providing the territory with its own production products in the Samara region (calculated by the authors according to the data of the Territorial Body of the Federal State Statistics Service for the Samara region).

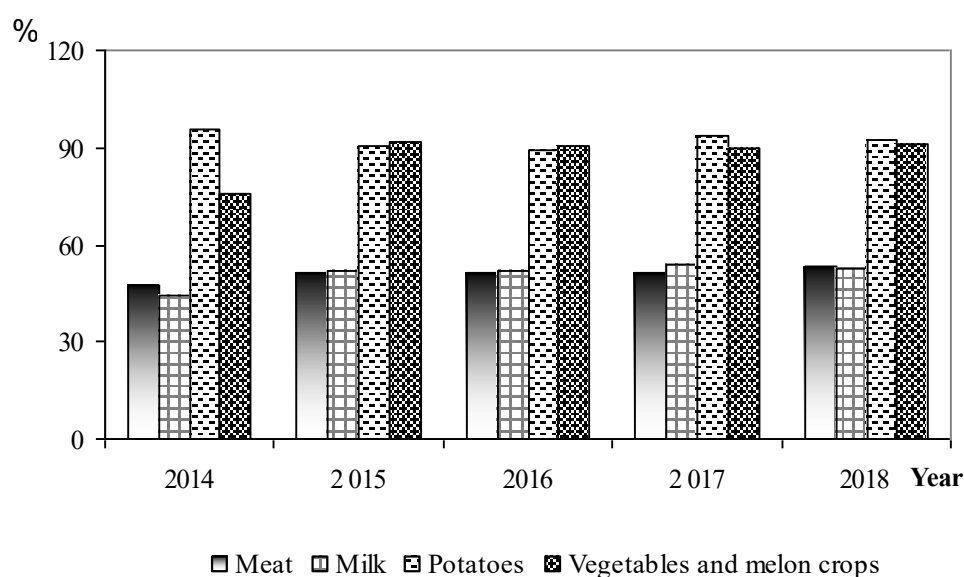


Figure 3. Food security in the Samara region (calculated by the authors according to the data of the Territorial Body of the Federal State Statistics Service for the Samara region).

In accordance with Order of the Ministry of Health of the Russian Federation No. 614 dated August 19, 2016 ‘On the approval of recommendations on rational norms for the consumption of food products that meet modern requirements for a healthy diet’ the values of food consumption rational norms were established. They were: for meat - 73 kg year⁻¹ per person, for milk - 325 kg, for potatoes - 90 kg, for vegetables and melons - 140 kg.

To ensure the food security required level, it is necessary to maintain an appropriate level of state support for each type of product. To calculate the amount of government subsidies, it is proposed to use the following methodology.

Initially, to determine the required amount of products produced, it is proposed to calculate the territory's need for a given type of product, taking into account the declared level of self-sufficiency in kind and in value.

$$Y = \sum_{i=1}^L (Norm_i \cdot Ch \cdot Pr_i) \cdot I_i \quad (2)$$

where Y – the cost of agricultural products necessary to ensure the territory food security in accordance with the current doctrine, rubles; $Norm_i$ – rational consumption rate of the i food product necessary for an active and healthy lifestyle, kg per person; L – the number of food products types included in the population diet, pcs; Pr_i – the price of the i food product necessary for an active and healthy lifestyle, rubles kg^{-1} ; Ch – the population of the territory, persons; I_i – the level of self-sufficiency for the i food product in accordance with the current food safety doctrine, %.

At the second stage, we determine the need for subsidies.

$$Sub = Y \cdot PSE \quad (3)$$

where Sub – the required amount of subsidies to ensure the food security level in accordance with the current doctrine, rubles; PSE – the support level for agricultural producers, %.

Based on the agricultural products average prices (Table 1), the population size (Table 2) and the average PSE value (on average over 5 years equal to 7.8%), the need for subsidizing the production of selected food products can be calculated. Estimated data show that to fully provide the region population, it is necessary to produce about 230 thousand tons of potatoes, 1,040 thousand tons of vegetables, 287 thousand tons of cattle and poultry meat, and 447 thousand tons of milk (Table 3).

Table 1. Average producer prices for agricultural products*

Product	2014	2015	2016	2017	2018
Potatoes	10,846	10,849	7,983	10,439	10,662
Vegetables	19,020	23,784	19,637	17,151	16,097
Livestock and poultry (live weight)	58,758	73,348	72,665	94,566	97,706
Milk	19,717	21,314	22,525	25,193	22,745

*– data of Territorial body of the Federal State Statistics Service for the Samara region.

Table 2. Initial indicators for calculation*

	2014	2015	2016	2017	2018
Population, total	3,212.7	3,206.0	3,203.7	3,193.5	3,183.0
State support level indicator (PSE), %	9.8	7.0	6.3	7.6	8.3

*– calculated by the authors according to the data of the Territorial Body of the Federal State Statistics Service for the Samara region.

Table 3. The required amount of agricultural products for the region self-sufficiency, thousand tons

Product	2014	2015	2016	2017	2018
Potatoes	234.5	234.0	233.9	233.1	232.4
Vegetables	1,044.1	1,042.0	1,041.2	1,037.9	1,034.5
Livestock and poultry (live weight)	289.1	288.5	288.3	287.4	286.5
Milk	449.8	448.8	448.5	447.1	445.6

From the data in Table 4 it can be seen that the cost of products required for self-sufficiency in the region ranges from 46,058.2 million rubles in 2014 to 58,861.6 million rubles in 2017, depending on the population size and market conditions.

Table 4. The cost of agricultural products necessary for the region self-sufficiency, million rubles

Product	2014	2015	2016	2017	2018
Potatoes	13,780.3	17,166.2	16,994.2	22,045.7	22,702.9
Vegetables	20,587.1	22,208.1	23,453.1	26,147.5	23,529.1
Livestock and poultry (live weight)	3,136.0	3,130.4	2,301.8	3,000.3	3,054.3
Milk	8,554.8	10,675.2	8,807.5	7,668.0	7,173.1
TOTAL	4,6058.2	53,179.9	51,556.6	58,861.6	56,459.5

To assess the results obtained, it is necessary to introduce the concept of a state support sufficiency criterion, taking into account the provisions of the food security doctrine.

The criterion for the adequacy of the government funding amount, taking into account the provisions of the current food security doctrine:

$$\sum PSE_i \cdot I \cdot (Norm_i \cdot Ch \cdot Pr_i) - \sum PSE_i \cdot K_i \cdot (Norm_i \cdot Ch \cdot Pr_i) > 0 \quad (4)$$

When a negative value is obtained, we are talking about the underfunding of the industry, and the absolute value of the indicator indicates the subsidies amount that have not been received by agricultural producers. Based on the data in Table 5, it can be seen that, since 2017 there has been an underfunding of agricultural production, based on this criterion.

Table 5. Amount of subsidies required to ensure food security in the region, million rubles

Product	2014	2015	2016	2017	2018
Potatoes	1,074.9	1,339.0	1,325.5	1,719.6	1,770.8
Vegetables	1,605.8	1,732.2	1,829.3	2,039.5	1,835.3
Livestock and poultry (live weight)	244.6	244.2	179.5	234.0	238.2
Milk	667.3	832.7	687.0	598.1	559.5
Total for selected types of products	3,592.5	4,148.0	4,021.4	4,591.2	4,403.8
Actual subsidies for all agriculture in the region	6,029.4	4457.2	4,129.4	3,900.0	4,354.3

A positive aspect of this indicator is its comprehensive nature, taking into account not only the subsidies size allocated to agriculture, but also the level of existing production. Positive values of this criterion can be obtained only if both conditions are met simultaneously.

CONCLUSIONS

Based on the above calculations, it can be seen that the existing subsidy system in the Samara region is not optimal from the ensuring food security view point. As can be seen from the data in Table 5, the amount of optimal state support for the four selected product groups practically coincides with the full amount of state support for the region agro-industrial complex, which indicates either underfunding of production for both these and other product groups. In 2017–2018 the amount of state support, based on the

above calculations, had to be increased by at least 100–500 million rubles. The above calculations imply that the amounts determined in the article are characteristic of the existing system of agricultural support in the region and extrapolate the current laws. The calculated standards will change with the improvement of the agricultural production system in the region, a set of state support measures and production potential.

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