

# METHODOLOGY FOR ASSESSMENT OF REGIONAL FOOD SECURITY

**Olga Nikolaevna Soboleva, Vyatka State University**

**Anastasia Alexandrovna Petukhova, Tourism and Trade of Vyatka State University**

**Tatyana Valerievna Makarova, Vyatka State University**

**Anna Vladimirovna Spengler, Vyatka State University**

**Elena Aleksandrovna Yushina, Vyatka State University**

## ABSTRACT

*The article examines the methodology of assessing the food security of a region. In the process of choosing the most optimal method of complex food security assessment, we proposed applying the technique developed by Olovyannikov (2009), which allows using the available statistical information in the process of food security research at the regional level. The definition of food safety criteria is proposed on the basis of the coefficients within four levels: high, acceptable, low and unacceptable. The approbation of the methodology of integrated assessment of regional food security proposed by Olovyannikov (2009) was conducted on the example of a region that has a low level of socio-economic development. This methodology can be applied to regions with different levels of development and available potential. In Russia, more than 70% of regions have a low level of socio-economic development and only 4-5 subjects have a high level of development and economic security. In the current circumstances, this weakens the economic security of not only the regions but also the state as a whole. The technique proposed by Olovyannikov (2009) allows determining the criteria, contributing to the weakening of economic security of the territories and, in accordance with this, to make the right strategic decisions to equalize the situation and strengthen the positions of the regions. Based on the main indicators of the methodology, it was determined that a low level of economic security had been formed in the Kirov region. In this situation, the region needs to use the maximum of the available natural, human and other resources by choosing the optimal strategy of increasing the level of food security.*

**Keywords:** Food Security, Food Independence, Food Self-Sufficiency, Physical Accessibility of Food.

## INTRODUCTION

The national problems, which practically every state tries to solve as soon as possible and in a more efficient way, regardless of the level of its political and socio-economic development and the situation in the world, include the problem of reliable supply of the population with domestic food. The governments of some countries are responsible for solving this problem (World food summit plan of action, 1996). Food security is the main factor of political and socio-economic stability of each state. Russia is not an exception (Makhanko and Volokhatykh, 2016). The differentiation of the Russian regions in terms of living standards and uneven distribution of

household incomes and the degree of agricultural development presupposes the need to assess the level of food security of the regions and macro regions of the country in order to identify effective measures of agrarian policy to maintain a sufficient level of food security (Yunusova, 2008). In this regard, Russia's food security comprises the level of food security in the regions. Studies show that 90% of the regions have a low level of economic and food security. In this connection, we are faced with the task of choosing the methodology of assessing the level of food security in a region that will let us redistribute the problems and decide on the right way to develop food security. At the initial stage, it is necessary to define the group of the food security assessment indicators, which can be divided into the following groups: natural indicators, relative indicators, technical indicators, Economic indicators, social indicators, demographic indicators.

## MATERIALS AND METHODS

An analysis of the author's approaches to assessing the food security of the region has shown that at present there is no single point of view among scholars on the methodology for assessing food security (Antamoshkina, 2015; Paramonova and Pashin, 2004; Grachev, 2016; Ivanov, 2013; Terentyev, 2004; Olovyannikov, 2009). There is also no consensus on the system of criteria and indicators that determine the level of food security. In some cases, the provision of food security is considered as the sustainable development of the agro-industrial complex, in others-as the level of self-sufficiency of the population with food. The basis of all methods is indicators, which are defined by the Doctrine of Food Security of the Russian Federation (Shagaida and Uzun, 2015; Decree of the president of the Russian federation, 2010). These indicators are correlated with the criteria: the level of food self-sufficiency in the region; the degree of satisfaction of physiological needs of the population in food products; the level of economic accessibility of food. The authors opine that the most effective and useful methodology for assessing food security is the methodology proposed by Olovyannikov (2009).

Olovyannikov (2009) offered the methodology for the comprehensive assessment of the Degree of Regional Food Security (DRFS), which was calculated as a sum of assessments of the main criteria for food security:

$$\mathbf{DRFS=P+E+S+Q} \quad (1)$$

Where, P was the physical accessibility

E was the economic availability

S was the sufficiency of food consumption

Q was the quality of food

At the initial stage, according to formula 1, it is necessary to determine the physical availability of food, which is determined through the food import coverage ratio ( $C_c$ ), calculated by formula 2:

$$\mathbf{C_c=(V\ of\ food\ exports)/(V\ of\ food\ imports)} \quad (2)$$

The next stage determines the economic accessibility (formula 3), which is based on the distribution of food products among different social groups of the population at the current level of prices and income.

Economic availability is determined on the basis of the following indicators:

( $C_p$ ) is the coefficient of poverty reflecting the portion of population with incomes below the subsistence minimum, calculated as follows:

$$\mathbf{C_p=(Population\ with\ incomes\ below\ the\ subsistence)/(Total\ population)} \quad (3)$$

( $C_i$ ) is the purchasing power of the regional population's incomes, calculated as follows:

$$C_i = (\text{subsistence}) / (\text{average income per capita}) \tag{4}$$

(C<sub>g</sub>) is the Gini index, coefficient of income concentration, characterizes the degree of uneven distribution of the population by income level:

$$C_g = 1 - \sum (i-1) \cdot n(L_i - L_{i-1}) (S_{i-1} + S_i) \tag{5}$$

Where L<sub>i</sub>, L<sub>i-1</sub> are the portion of population within an interval;

S<sub>i</sub>, S<sub>i-1</sub> is the portion of aggregate income (as on the beginning and end of the i<sup>th</sup> interval)

The criteria for assessing the level of economic accessibility of food are presented in Table 1.

<b>Table 1</b> <b>CRITERIA FOR ASSESSING THE LEVEL OF ECONOMIC ACCESSIBILITY OF FOOD</b> <b>(OLOVYANNIKOV, 2009)</b>			
Level	Coefficient of Poverty (C <sub>p</sub> )	Coefficient of Purchasing Power of the Regional Population's Incomes (C <sub>i</sub> )	Gini Index, Coefficient of Income Concentration (C <sub>g</sub> )
High	0	Under 0.07	0-0.10
Permissible	0-0.10	0.08-0.20	0.11-0.30
Low	0.11-0.20	0.21-0.70	0.30-0.50
Impermissible	Above 0.20	Above 0.70	Above 0.50

The sufficiency of food consumption is determined through the coefficient of sufficiency (Caloric Value) (C<sub>cv</sub>), measured by the caloric content of the products that constitute the actual daily diet of a person, taking into account the crisis parameter. The coefficient of nutritional structure (ration) (C<sub>r</sub>) characterizes the deviation from the recommended medical norms of food consumption. The final evaluation is based on the average value of the coefficient.

The criteria for assessing the level of food sufficiency are presented in Table 2.

<b>Table 2</b> <b>CRITERIA FOR ASSESSING THE LEVEL OF FOOD SUFFICIENCY (OLOVYANNIKOV, 2009)</b>		
Level	Coefficient of Food Sufficiency (C <sub>s</sub> )	Coefficient of Nutritional Structure (C <sub>r</sub> )
High	Above 3.050	Above 0
Permissible	2.150-3.050	(-15)-0
Low	1.520-2.150	(-30)-(-15)
Impermissible	Under 1.520	Under (-30)

The quality of food in accordance with the methodology is assessed using a quality coefficient (C<sub>q</sub>), measured through the proportion of rejected products. The criteria for assessing the level of food quality are presented in Table 3. Thus, the DRFS is found using formula (1).

<b>Table 3</b> <b>CRITERIA FOR ASSESSING THE LEVEL OF FOOD QUALITY (OLOVYANNIKOV, 2009)</b>	
Level	Coefficient of Food Quality (C <sub>q</sub> )
High	0
Permissible	Under 0.10
Low	0.10-0.20
Impermissible	Above 0.20

Olovyannikov (2009) suggests the assessment of the level of the regional food security based on the scores: high-1 point, acceptable-2 points, low-3 points, unacceptably low-4 points; he also suggests border values, low enough not to meet the sum of the received indicators.

As a result, we suggest the following intervals of the values of the level of economic security: high  $DRFS \geq 15$ , acceptable  $16 < DRFS < 30$ , low  $31 < DRFS < 45$  and unacceptable- $44 < DRFS < 60$ .

## RESULTS

The approbation of the method of food security assessment proposed by us was carried out on the example of the Kirov region, which has a sufficient agrarian potential. Regions, having different potential for the development of agriculture, have a different level of contribution to Russia's food security.

The economic accessibility of food characterizes the distribution of food products between different social groups of the population at the prevailing level of prices and incomes.

The indicators of food security in the Kirov region obtained using Olovyannikov's (2009) method are presented in Table 4.

Parameter	Value Over the Year, Points				
	2011	2012	2013	2014	2015
Physical accessibility	3	4	4	4	1
Economic accessibility	9	9	9	9	9
Sufficiency of food consumption	5	5	5	5	5
Quality of food	2	2	2	2	2
Level of regional food security	19	20	20	20	17

Source: Compiled by the authors

After assessing the level of food security in Kirov Region, it can be concluded that the region has a generally low level mainly due to the low level of the purchasing power of the population and the high level of poverty. In this regard, certain measures are required to increase the income level of the population, creating an increase in demand for food products, and that, as a result, will lead to an increase in the activity of the enterprises, food production and the provision of the products of own production.

## DISCUSSION

The features of food security of the regions, as the studies by the authors show, are as follows (Yunusova, 2008):

1. A region's food security is based on its own agricultural and food production.
2. Regions have great differences in the production of organic food.
3. The formation of food security in a region largely depends on its location, specialization, infrastructure development, transportation costs and food storage costs. Limited opportunities for food imports lead to a reduction in imports of products and a reduction in interregional exchange.
4. A region's food security is more affected by funding shortfalls, as a rule, it has a weakly developed mechanism of formation.

Korbut proposes assessing the regional food security using the indicators that take into account the share of food expenditures and territorial accessibility of food products.

Paramonova and Pashin (2004) group the indicators of regional food security assessment into four blocks and that completely coincides with the methodology of Olovyannikov.

The methodology of assessing the food security of the region proposed by Ternoskaya is based on Vlasyuk's methodology of quantitative estimates, and proposes the development of an analytical model that would make it possible to carry out a comprehensive assessment of the regional food security on the basis of a comparative analysis, as well as assess the changes in the state of its food security during a certain period.

As a result of the analysis of the methods of assessing regional food security, it can be concluded that it is impossible to use them in their current form because of their rather serious shortcomings. Thus, the development of a methodology for assessing food security created by Olovyannikov is currently extremely relevant.

## CONCLUSION

Unmet needs create conflict. It is necessary again and again to strain the intellect to invent new ways of meeting these needs. Thus, based on the theory of innovative development, it becomes clear that in the present century, the basis for the progress of the economy is not just innovations, but fundamental science as one of the strategic components of the development of the entire society onto the whole level, including the food supply of the country and its regions. This is the authors' understanding of the modern paradigm of improving Russia's economic and food security.

The proposed methodology for food security in the region allows identifying the weaknesses of the regions and the Russian Federation as a whole. The structure of the baseline indicators and their assessment can become useful for forecasting the state of food security in the region. The formed information monitoring system will allow the authorities making effective management decisions on food security in the region.

## REFERENCES

- Antamoshkina, E.N. (2015). Evaluation of food security in the region: Methodology issues. *Prodovolstvennaya Politika I Bezopasnost*, 2(2), 97-112.
- Decree of the president of the Russian federation (2010). On the approval of the doctrine of food security of the Russian federation.
- Grachev, S.A. (2016). Methodology for identifying the level of food security of the country. *Nauka I Praktika Regionov*, 3(4), 26.
- Ivanov, A.A. (2013). Estimation of the food safety of the population of Krasnoyarsk region. *Vestnik Buryatskoi Gosudarstvennoi Selskokhozyaistvennoi Akademii Im*, 3(32), 105-111.
- Makhanko, G.V., & Volokhatykh, A.S. (2016). National food security and food independence of Russia in conditions of sanctions. *Nauchnyi Zhurnal KubGAU*, 116(2).
- Olovyannikov, D.G. (2009). Methodology for assessing the state of food security in the region on the example of the republic of buryatia. *Izvestiya IGEA*, 3(65), 60-63.
- Paramonova, S.V., & Pashin, L.L. (2004). Assessment of food security in the region.
- Shagaida, N., & Uzun, V.Y. (2015). *Food security in Russia: Monitoring, trends and threats*. Moscow: Izdatelskii dom "Delo" RANKhiGS.
- Terentyev, Y.I. (2004). Methodology for determining the level of food security.
- World food summit plan of action (1996). Rome declaration on world food security.
- Yunusova, P.S. (2008). Features of the formation of the system of food security of the region. *Regionalnye Problemy Preobrazovaniya Ekonomiki*, 2, 126-136.