Subsidizing agricultural production of the region to achieve food security

V V Nosov¹, K A Zhichkin², L N Zhichkina³, S A Novoselova⁴, N L Fomenko⁵ and L P Bespamjatnova ⁶

¹ Department of Economics and Management, K.G. Razumovsky Moscow State University of technologies and management, 73 Zemlyanoy val, 109004, Moscow, Russia
² Department of Economic Theory and Economics of AIC, Samara State Agrarian University, 2 Uchebnaja Street, 446552, Kinel, Russia
³ Department of Land Management, Soil Science and Agrochemistry, Samara State Agrarian University, 2 Uchebnaja Street, 446552, Kinel, Russia
⁴ Department of Accounting, Analysis and Audit, Saratov State Vavilov Agrarian University, Teatralnaya square 1, 410012 Saratov, Russia
⁵ Department of Psychology and Applied Sociology, Yury Gagarin State Technical University of Saratov, Polytechnicheskaya street, 77, 410054 Saratov, Russia
⁶ Don Cossack State Institute of Food Technology and Business, K.G. Razumovsky Moscow State University of technologies and management, 73 Zemlyanoy val, 109004, Moscow, Russia

E-mail: novla@list.ru

Abstract. According to the current Food Security Doctrine, in the Russian Federation, the main indicator of food security is food self-sufficiency. Along with this indicator, we propose to use the self-sufficiency level indicator when planning food security of a certain territory and introduce the concept of the adequacy of state support. Based on calculations, it can be stated that the existing subsidy system of the Samara region is suboptimal in terms of ensuring food security. Subsidies for four product groups are almost equal to agricultural state support in the Samara region, which indicates underfunding of production of these and other product groups.

1. Introduction

The demand for food grows every year with the increasing world population. Many countries experience food scarcity, which has a negative impact on morbidity and mortality rates, limits the cognitive development of a person and prevents human capital accumulation [1-7]. Besides, enough food in terms of quantity and quality is key for maintaining and promoting political stability and ensuring peace among people [8-9]. Provision of food for the population of the Russian Federation is the main direction towards ensuring national security. In the Russian Federation the term «food security» was officially introduced in 2010 in the Decree of the President of the Russian Federation «On approval of the Food Security Doctrine of the Russian Federation». According to the Doctrine, food security is a state of a country’s economy, which ensures food independence of Russia, guarantees physical and economic accessibility of food products that meet the requirements of Russia’s legislation on technical regulation for every
citizen of the country in the amounts not less than the established norms of healthy nutrition necessary for an active and healthy life. However, by this time, the food security concept was firmly established in the world practice. Food security exists when all people, at all times, have physical and economic access to sufficient, safe, and nutritious food to meet their dietary needs and food preferences for an active healthy life [10]. Following the recommendation of experts gathered in the Committee on World Food Security (CFS) Round Table on hunger measurement, hosted at FAO headquarters in September 2011, a set of indicators was developed that describes four pillars of food security: availability, access, stability, utilization [11]. There is a different approach to quantitative food security in Russia - the key indicator is the output of products above the threshold, i.e. in accordance with the current Food Security Doctrine, self-sufficiency should be determined for the i-th product.

Though it may seem that this question was explored in foreign countries [8-9, 12-14] and Russia [15-22], these studies did not adopt the adequacy criterion for state support. According to the Doctrine, budget support to agricultural producers allows reaching self-sufficiency threshold. Insufficient budget support of agricultural producers in Russian regions does not allow for threshold to be reached, even on territories with favorable conditions for agricultural production. The purpose of this study is to determine the amount of subsidies to agricultural producers of the Samara region to ensure food security of the region.

2. Methods and Materials

To calculate the amount of state subsidies we propose to use the following approach. In compliance with the current Doctrine, the demand of a subject of the Russian Federation for subsidies for ensuring food security can be determined using the following formula:

\[ SA = SL \times \left( \sum_{i=1}^{n} \left( N_i \times S \times p_i \right) \times K_{i,\text{norm}} \right) \]

where \( SA \) is the amount of subsidies required to ensure the level of food security in accordance with the current Doctrine, rubles;

\( SL \) is the level of support of agricultural producers, %.

\( N_i \) is the rational consumption rate of the i-th product, necessary for an active and healthy life, kg/person;

\( p_i \) is the price of the i-th product, necessary for an active and healthy life, kg/person;

\( S \) is the average population of a territory, people;

\( K_{i,\text{norm}} \) is the level of self-sufficiency for the i-th product in accordance with the current Food Security Doctrine, %;

\( n \) is the number of product types in the population’s diet, pcs.

When planning food security of a certain territory, we propose to use the indicator of self-sufficiency level along with the Food Security Doctrine indicators. This indicator shows the domestic production of food per capita:

\[ K_{i,FP} = \frac{Q_i + \Delta Q_i^S - Q_i^E}{S \times N_i} \]

where \( K_{i,FP} \) is self-sufficiency rate of a territory;

\( Q_i \) is the agricultural output of a territory;

\( \Delta Q_i^S \) are changes in the i-th product stock over the year.

In this study, we introduced the adequacy criterion for state support taking account of the provisions of the Food Security Doctrine:
\[ \Delta S = SL \times \left( \sum_{i=1}^{n} (N_i \times S \times p_i) \times K_{i, norm} \right) - \sum_{i=1}^{n} \left( N_i \times S \times p_i \right) \times K_{i, FP} \]

If the indicator is negative, the sector is underfunded, therefore, agricultural producers do not get enough subsidies.

The advantage of this composite indicator is that it includes both the amount of subsidies to the agricultural sector and the level of production.

3. Results and Discussion
Components of the modern concept of food security are presented in figure 1.

This approach implies that food securities of the country, region and territory are closely linked and ensured through the unified system of living standards. Maintenance of these standards is the primary function of the government, which is ensured through the system of institutional arrangements and transfers to beneficiary regions. Performance of this function depends on specific features of territories, such as per capita income, level of consumer prices for food, etc.

Figure 2 presents the self-sufficiency rate of the Samara region. Calculations based on the Samara region data show that taking into account only data on the region’s self-sufficiency, it produces enough potatoes and vegetables to meet the needs of the population. Meat and milk self-sufficiency is 43% and
37% respectively. On a positive note, compared to 2014, in 2018 we can see an increase in the indicator for these agricultural products.

To ensure the required level of food security, an appropriate level of state support should be maintained for each product type. Based on average prices for agricultural products, population and level of support for agricultural producers (SL) which equals 7.8% (over the 5 years), we can determine the demand for subsidies for the production of selected products. The results are presented in figure 3.

Calculated data show that to fully supply the population of the region, 230 thousand tons of potatoes, 1040 thousand tons of vegetables, 287 thousand tons of meat and poultry and 447 thousand tons of milk should be produced. Taking into account only data on the region’s self-sufficiency, we can conclude that the Samara region produces enough potatoes and vegetables. As may be seen from figure 3, in 2018

Figure 2. Samara region self-sufficiency rate. Calculated by authors.

Figure 3. The amount of subsidies required to ensure food security of the region, million rubles. Calculated by authors.
the sum of adequate state support for four product groups is almost equal to state support for the agricultural sector of the region, which indicates underfunding of production of these and other product groups. It is worth mentioning that in 2018 the total amount of subsidies for the agricultural production of the Samara region declined by 28.8% (1675.1 million rubles). In 2018 the general need in subsidies have increased by 811.3 million rubles or 22.6% compared to 2014.

4. Conclusion
Food security is an integrated economic category. Russian Federation uses different criteria of food security than the ones proposed by the Food and Agriculture Organization (FAO) of the United Nations. According to the current Food Security Doctrine, in the Russian Federation, the main indicator of food security is food self-sufficiency. Along with this indicator, we propose to use the self-sufficiency level indicator when planning food security of a certain territory and introduce the concept of the adequacy of state support. Based on calculations, it can be stated that the existing subsidy system of the Samara region is suboptimal in terms of ensuring food security. Subsidies for four product groups are almost equal to agricultural state support in the Samara region, which indicates underfunding of production of these and other product groups.

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