Investments as a factor for ensuring food security in the Russian Federation

K E Tyupakov, A E Mikhailov
Kuban State Agrarian University, Krasnodar, Kalinina, 13, 350004, Russia
E-mail tupakov@yandex.ru

Abstract. The article analyzes the indicators of food security and the level of food self-sufficiency in the Russian Federation. The indicators of physical and economic availability of food for various national groups by income level were calculated. We justified a positive impact of investments in fixed assets of agricultural organizations on the level of self-sufficiency in the country with agricultural commodities, products and food. The reasons for the low efficiency of investment activities in the agro-industrial sector are identified, which elimination provides achieving the criteria indicators of Food Security Doctrine in the Russian Federation.

Keywords: Food security; Self-sufficiency; Independence; Food availability; Investment.

1. Introduction
Food security in current circumstances plays an important role in strengthening the national security of the country. Numerous research has been focused on the concept and essential characteristics of food security at different levels of its hierarchical structure. For example, Bremer J., Altukhov A. I., Nazarenko V. I., Vermel D. F., Uskova T. V., Ushachev I. G. highlighted a wide range of issues from the individual to global level.

Food security is officially presented as an indicator of state welfare. It is considered as the provision of domestic food of appropriate quality in the required quantities and creating of conditions to maintain the consumption level of scientific and recommended standards for active and healthy life. It is based on the indicators of physical and economic availability of food, safety of consumed products and sustainability of agricultural development. Based on this, the development of the agricultural sector of the economy directly affects the level of food security and the assessment of the level of self-sufficiency in food resources is crucial for strengthening food security at the national and global levels.

2. Methods
The research methodology is based on a general scientific methodology, which provides the use of methods of unified logical, structural, system-functional and comparative analysis.

3. Results of the study
The basis for ensuring the national food security is its agro-industrial complex, which provides the necessary agricultural production, raw materials and food for domestic consumption. The Food Security Doctrine of the Russian Federation, approved by presidential decree on January 21, 2020, defines the threshold values of food independence for a number of agricultural and food products. The share of domestic production of grain, sugar, meat, milk, fish, potatoes, vegetables should be at least 85-95% in the structure of domestic consumption. Given the difficult natural and climatic conditions for the production of fruit and berry crops, the share of domestic fruits and berries to ensure food independence is 60%.
Currently, the level of self-sufficiency in grain, vegetable oil, all types of meat, sugar and potatoes exceeds the threshold values. The production of grain and leguminous crops exceeded the threshold level by 60.5 p.p. in 2019, vegetable oil by 85.9 p.p., sugar by 35.4 p.p., which in turn raises the question of exports. The growth in meat production of all types reached the threshold of 85% by 2015. In 2019 it increased by 11.7 p.p. However, it should be noted that about 60% of the consumption of meat and meat products is provided only by the production of poultry meat. Annual growth rates of production volumes at 2-3% level of milk and dairy products, potatoes, vegetables and melons reach the threshold values in the nearest future. Despite significant state support for the fruit and berry industry, the threshold level for providing the population with fruits and berries has not yet been reached. The share of domestic fruits and berries in the structure of consumption is 40.2%. Table 1 presents the dynamics of the self-sufficiency level of the population with basic types of food (a ratio of the level of domestic production and consumption).

Table 1. The level of self-sufficiency in basic food products by the Russian population, %

| Food               | 2000 | 2005 | 2010 | 2015 | 2017 | 2018 | 2019 | 2019 to 2000 (+; -) |
|--------------------|------|------|------|------|------|------|------|---------------------|
| Meat and meat food | 67,0 | 62,6 | 72,2 | 88,7 | 93,5 | 95,7 | 97,4 | 30,4                |
| Milk and dairy     | 88,3 | 82,5 | 80,5 | 79,9 | 82,3 | 83,9 | 83,9 | -4,4                |
| Eggs               | 97,5 | 98,7 | 98,3 | 96,7 | 97,9 | 97,7 | 97,1 | -0,4                |
| Potato             | 99,6 | 100,7| 75,9 | 102,1| 93,2 | 95,3 | 94,9 | -4,7                |
| Sugar              | 98,4 | 103,2| 85,3 | 100,6| 115,1| 108,0| 125,4| 27,0                |
| Fish and fish products | 83,9 | 87,4 | 82,2 | 85,5 | 87,8 | 111,4| 124,5| 40,6                |
| Vegetables and cucurbits | 85,6 | 84,9 | 80,5 | 86,8 | 87,6 | 87,2 | 87,7 | 2,1                 |
| Fruit and berries  | 55,7 | 47,0 | 32,6 | 32,5 | 33,1 | 38,8 | 40,2 | -15,5               |

The analysis of the dynamics of the self-sufficiency level in basic food products showed that the level is quite high for almost all major types of food. A significant increase in the level of self-sufficiency has been observed since 2015 for meat, potatoes, sugar, fish, and vegetables. This trend is due to the state agricultural policy of import substitution due to the embargo imposed by Western countries and the introduction of retaliatory measures, which limited the share of imported food in the domestic market and served as a factor in the development of domestic agricultural production.

The availability of sufficient food is a necessary but not sufficient condition for assessing the level of food security. Scientifically-based food consumption standards are determined at the state level based on the need to maintain active and healthy lifestyle. Order of the Ministry of Health of the Russian Federation No. 614 of 19.08.2016 has approved rational norms of food consumption based on the modern requirements of a healthy diet, which should be used in planning of production in the agro-industrial complex and the formation of the balance of the national food resources. On average, the energy value of food consumed in Russian households is 2,644 kcal. Rural residents consume 200 kcal of macronutrients more than urban residents. The consumption dynamics of basic food products by the population of the Russian Federation is presented in Table 2.

Table 2. Consumption of basic food products in the Russian Federation, kg / year/person

| Food               | Scientific consumption rate | 2000 | 2010 | 2016 | 2017 | 2018 | 2019 | 2019 in % to recommended standard |
|--------------------|-----------------------------|------|------|------|------|------|------|----------------------------------|
| Bread and bakery products | 96                          | 116  | 102  | 117  | 117  | 116  | 116  | 120,8                           |
Despite the dynamics of growth in the consumption of vegetables and cucurbits, fruits, milk and dairy products, scientifically-based standards for these products have not been achieved, while the consumption of bread and bakery products, sugar, eggs significantly exceeds the standard indicators.

When assessing food security, it is required to take into account the level of population income, their purchasing power and food prices, which characterize the economic availability of food.

A comparative analysis of the price and income index of the population shows that the growth rate of the purchasing capacity of the population has decreased in recent years and is significantly lower than the growth in prices for basic food. Table 3 presents the indices of monetary income and consumer prices for basic food in the country.

Table 3. Indices of monetary income and consumer prices for basic provisions (% compared to the previous year)

| Index                                           | 2001 | 2010 | 2015 | 2016 | 2017 | 2018 | 2019 |
|-------------------------------------------------|------|------|------|------|------|------|------|
| Per Capita cash income                          | 134,2| 112,2| 109,7| 100,7| 102,3| 104,0| 107,9|
| Consumer prices for provisions:                 |      |      |      |      |      |      |      |
| - bread and bakery products                     | 117,1| 112,9| 114,0| 104,6| 101,1| 104,7| 102,6|
| - meat and poultry                              | 112,3| 107,4| 110,3| 104,3| 101,9| 105,9| 106,1|
| - milk and dairy products                       | 128,1| 103,4| 104,2| 100,2| 96,6 | 109,9| 98,5 |
| - fish and fish products                        | 105,2| 119,6| 108,7| 108,0| 103,9| 101,1| 106,8|
| - egg                                           | 123,8| 100,7| 124,9| 106,9| 103,6| 99,4 | 111,8|
| - potatoes                                      | 113,7| 112,9| 110,7| 98,7 | 85,1 | 126,2| 94,8 |
| - apples                                        | 122,0| 206,3| 74,7 | 101,7| 109,9| 107,1| 89,7 |

With the growth of consumer prices, the population of the country with low incomes is forced to revise their diet in favor of a set of cheap products of lower quality. The energy equivalent of the nutrition is also differentiated not only by income groups. It should be noted that in the group with the lowest incomes, the energy equivalent of food is about 1,880 kcal per day, while in the group with the highest incomes it exceeds 3,000 kcal. In this case, social tension inevitably arises in relations between different groups of the population.

The share of food products in the structure of consumer consumption in different countries accounts for from 6 to 40%. In Russia, expenditures of the population on food in the structure of all expenditures amounted to 36.9% in 2020. The population mostly spends on the purchase of meat and meat products (9.0%), milk and dairy products (3.1%) and confectionery (2.5%). It should be noted that the population with the lowest incomes spends 41-45% of money for food, and the group with the highest incomes spends
18-30%. The differentiation of food consumption by groups with various income levels is presented in Table 4.

Table 4. Food consumption and the share of food expenditures in the polar income groups of the population of the Russian Federation (kg per capita)

| Provisions                  | The group with the low incomes | The group with the high incomes |
|-----------------------------|-------------------------------|-------------------------------|
|                             | 2008  | 2018  | 2008  | 2018  |
| Bread and bakery products   | 83,7   | 91,1   | 94,2   | 94,5   |
| meat and poultry            | 47,6   | 59,0   | 96,3   | 111,8  |
| fish and fish products      | 12,7   | 14,3   | 24,7   | 28,0   |
| milk and dairy products     | 159,4  | 175,3  | 299,5  | 321,3  |
| potatoes                    | 51,2   | 53,0   | 66,9   | 60,7   |
| fruits and berries          | 31,3   | 42,3   | 92,2   | 101,7  |
| vegetables                  | 55,9   | 70,7   | 104,2  | 131,0  |
| Share of food expenditure in consumer spending, % | 59,0 | 43,9 | 29,2 | 27,2 |

Table 4 shows that during the studied period food consumption increased in all decile groups of the Russian population. However, the differentiation between the low income group and the high income group remains unacceptably large.

The analysis of Russia's food security indicators showed that the national population and production needs taking into account domestic production, imports and rolling stock are fully provided with food and agricultural raw materials. There is a steady increase in the national supply of grain, potatoes, sugar, meat, eggs and vegetable oil. There is a critical situation in providing the population with fruits and berries, vegetables and melons, milk and dairy products. The consumption level is currently achieved by imports, despite the fact that the potential possibilities for food production in the country is great.

Investment plays an important role in the system of indicators that characterize the development of agriculture. The funds allocated for the construction, reconstruction, and modernization of production facilities and equipment lead to an increase of initial cost and the economic efficiency of production. The purchase of machinery, equipment, vehicles, production and household equipment, formation of a productive and working herd, production of perennial plantings and investments in intellectual property objects contribute to the development of agricultural production in the country and agricultural regions.

A retrospective analysis of the investment activities of agricultural organizations showed that since the 90s, all possible measures have been taken in the Russian Federation to preserve the production potential through capital investments in agricultural production. The trend and efficiency of investment activity in agriculture is shown in Figure 1. The obtained results provide to distinguish several stages of investment activity development. From 1995 to 1999, the formation of market relations in the industry took place. For the period from 2000 to 2008 there was a rapid increase in investment (more than 10 times). Joint ventures have been created, production facilities that have fallen into disrepair have been modernized, new technologies have been introduced. From 2010 to 2013, the growth rate increased and by 2013, the volume of investments in agriculture reached 516 billion rubles. The introduction of economic sanctions in 2014 only stimulated the development of agricultural production, which led to a 50% increase in capital investment.

Currently, the agriculture of the Russian Federation is an attractive industry for both domestic and foreign investors. Given the natural and climatic conditions, the uneven distribution of population and resources, central and southern regions of the country are the leaders in attracting investment. They contain more than 80% of all investments coming into the industry.
The trend analysis shows that the analytical alignment of investment volumes for 1995-2019 and its specific weight in Russia was expressed in terms of a polynomial equation as the most reliable reflection of the dependence of the studied factor on time, as evidenced by the values of the determination coefficient. In the trend model of investment volumes, the accuracy of the dependence and the production model are confirmed by 97.2% and 84.7%, respectively.

Investment is an important factor affecting the level of self-sufficiency in agricultural raw materials and food. The introduction of promising innovative technologies, technical re-equipment with high-performance means of production, and state support enhance agricultural producers to ensure the food security of the country.

The high degree of influence of investments on the indicators of economic efficiency in agricultural organizations was revealed as a result of the analysis of statistical groupings of agricultural organizations in the Krasnodar Territory. Currently, more than 250 investment projects are being implemented in the Krasnodar Territory in the agricultural sector of the economy. The Krasnodar Territory takes 13th place in the national rating of the investment climate in the Russian Federation. The maximum investment rating in the potential of the Krasnodar Territory is 1A. In terms of investment, the region occupies the 6th place after Moscow, St. Petersburg, Moscow regions and Leningrad regions. Over 25 years of investment development, foreign investors have implemented more than 100 major projects worth about $20 billion. About 900 enterprises of the Krasnodar Territory have been created in cooperation with foreign companies from 70 countries.

This study presents the indicators of production and operational activity of 197 farms in the Central and Northern districts of the Krasnodar Territory. The indicator of investment per 1 ha of agricultural land was chosen as an effective indicator. It characterizes the efficiency of the renewal production assets. The grouping of agricultural organizations is shown in Table 5.

### Table 5. Grouping of agricultural organizations of the Krasnodar Territory by the level of investment per 1 ha of agricultural land, 2018

| Indicator                          | Groups of farms by investment level, thousand rubles/ha | Total and average |
|------------------------------------|--------------------------------------------------------|-------------------|
|                                    | ≤ 5,0 | 5,1-10,0 | 10,1-15,0 | 15,1-20,0 | ≥ 20,1 |                      |
| Number of farms in the group       | 45    | 50       | 43       | 20        | 39     | 197                  |
| Cost of sales, thousand rubles     | 188,9 | 207,8    | 249,6    | 270,5     | 424,2  | 261,8                |
Analysis of the groups showed that in 2018 about 30% of agricultural producers were in a group with the investment level from 10 to 20 rubles/ha, with 26.4% of average profitability of the Krasnodar Territory. It should be noted that with increase in investment affects reduction of economic efficiency of production and sales of agricultural products. Thus, the agricultural organizations of the fifth group with a investment level per 1 ha of 20.1 thousand rubles or more. In comparison with the first group, there is an increase in the cost of products sold by more than 2 times, while the profit increase is not higher than 40%. From farms with a total investment of 1 ha from 15.1 to 20.0 thousand rub/ha profitability is above 28.7 thousand rub, at cost of 249.6 thousand rub, which allowed to obtain the profitability of 30.7%. Therefore, in the conditions of the Krasnodar territory, the investment level per 1 ha from 15.1 to 20.0 thousand rubles/ha enables agricultural organizations to optimize the available natural resource potential.

However, the presence of investments does not always characterize the growth of agricultural production. The analysis showed that the heterogeneity of the socio-economic development of the municipal districts in the Krasnodar Territory leads to the differentiation of the development level of the agricultural production. In the largest districts of the region the level of profitability exceeds the average regional level for more than 20%. These regions are: Abinsky, Beloglotsky, Bryukhovetsky, Gulevichsky, Kavkazsky, Krylovsky, Novokubansky, Novopokrovsky, Otradensky, Slavyansky, Starominsky, Uspensky, Ust-Labinsky, Shcherbinovsky. Agricultural production is unprofitable in such areas as Armavir, Belorechensky district, Seversky district, Sochi.

4. Conclusion
Efficiency improvement of agro-industrial production by optimizing investment resources in regional agro-industrial complexes is a key factors for ensuring food security and the level of self-sufficiency with domestic agricultural raw materials, products and food. One of the reasons that negatively affects the efficiency of investments is the limited access of agricultural organizations to the regional infrastructure. A significant obstacle is still the expensive procedure of connecting the acquired means of production to the engineering networks, that reduces the efficient realization. The second problem is the low availability of industrial land and manufacturing realty, the low level of transport infrastructure within the country and especially in the eastern regions. The insufficient number of investment sites, technology parks and business incubators does not allow investors to make a timely decision on investing money.

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