

**LEASECON 2020**  
**International Conference «Land Economy and Rural Studies Essentials»**

**ASSESSMENT OF FOOD SECURITY OF AN INDUSTRIAL AND  
AGRARIAN REGION**

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**Abstract**

The level of food security of each region is influenced by natural and climatic conditions, the social and economic situation, the state of agro-industrial production and food markets, etc. Regional characteristics determine threats and dangers that affect the security of the region and the country as a whole. The analysis revealed a positive dynamics of the socio-economic situation and living standards of the population of the industrial-agrarian region (Voronezh region). There was an increase in such indicators as investments in fixed assets, the volume of shipped goods, works performed and services provided by the "Mining" and "Manufacturing" industries, the area of residential buildings, the amount of retail turnover, the average monthly nominal accrued wages, average per capita monetary income of the population, the average size of assigned pensions, etc. The paper analyzes food self-sufficiency of Voronezh region as the basis of the national food security and identifies its components. In 2017-2019, trends in the development of the food sector of Voronezh region were positive, as evidenced by the positive dynamics of changes in the number of cattle, pigs, agricultural products in value terms, the volume of production of livestock and poultry and milk. Voronezh region produced enough potatoes, meat, milk, and eggs for own needs. In recent years, the consumption of potatoes, meat and meat products, eggs and bread products has increased. Discrepancy of the diet with the recommended norms for vegetables and melons, milk and small products was revealed.

2357-1330 © 2021 Published by European Publisher.

*Keywords:* Agricultural sector, Food supply, industrial sector



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## **1. Introduction**

The community is developing at a dynamic pace and is exposed to a large number of various threats, as a result of which security issues are crucial. An important role is assigned to food security, which is a global problem of human civilization (Tsyraeva, 2016). Ensuring food security and food self-sufficiency is an important strategic task for each region and the country as a whole (Chekavinsky & Selimenkov, 2014).

The level of food security in a region characterizes the degree to which the population's needs for high-quality food are met, and the reliability of food supply. It is necessary to use indicators of production and consumption of basic types of food and food elements per capita, the degree of their physical and economic affordability and sufficiency based on medical (physical) standards.

## **2. Problem Statement**

The problem of food security is relevant due to the fact that the level of nutrition of the population reflects the degree of economic development of the region, and provision of the population with food is the main indicator for assessing the level of its social development (Subbotina, 2017). The basis of food security is food self-sufficiency as a system of interconnected subsystems structured according to organizational, functional, resource and technological characteristics, whose main purpose is reliable, uninterrupted provision of the population with food that is sufficient in terms of medical and hygienic standards (Timofeeva et al., 2016).

The level of food security depends on a large number of factors: technological, economic, social, political. The fundamental factor is the development of agricultural production (Gataullin & Sagatgareev, 2010; Kovaleva et al., 2016). Agrarian production provides the population with food, the processing industry provides them with raw materials. More than half of the consumed goods are generated from the final products of agricultural holdings (Mukhina, 2006). Consequently, the agricultural sector is of strategic importance and has a great influence on the level of well-being of the population (Zatsarinnaya & Prodanova, 2005). Food security is a guarantee of stable satisfaction of the population's needs for food (Monastyreva, 2020). Therefore, the level of agricultural production development determines the level of economic and food security of regions and the country as a whole.

## **3. Research Questions**

Food security is a national concern, however, it depends on the regions. It is urgent to ensure food security. It is one of the main global problems. Its solution is the most important condition for the stability and prosperity of the country as a whole and its regions.

#### 4. Purpose of the Study

The main purpose of assessing the food security of a region is to determine directions for the development of the regional agro-industrial complex aimed to improve its efficiency, to increase the volume of production of agricultural raw materials and food products to a level that ensures food security of the region.

#### 5. Research Methods

The following methods were used: the statistical method was used to collect quantitative data and identify general patterns of the socio-economic situation of the region and the level of its food supply; the comparison method was applied when comparing indicators of the base year and the past one; the coefficient method made it possible to determine the level of food self-sufficiency of the region.

#### 6. Findings

Voronezh Region is a region of the Russian Federation established on June 13, 1934 and located in the south-west of the European part of Russia. The area is 52.2 thousand km (0.3% of the territory of the Russian Federation). By the structure of the economy, Voronezh region is an industrial-agrarian region (Markin & Strigun, 2013). We will assess the general characteristics of Voronezh region using indicators of the socio-economic development (Vlasov, 2020) (Table 1) and living standards of the population (Table 2).

**Table 1.** Indicators of the socio-economic situation of the Voronezh region

Index	2017	Oct 2018	Dec 2019	Deviation (+;-)
Territory , thousand km <sup>2</sup>	52.2	52.2	52.2	-
Population, thousand	2335.4	2333.8	2327.8	-7.6
The population density per 1 km <sup>2</sup> , people.	44.73	44.71	44.59	-0.14
Fertilityrate ,%	10.7	9.6	9.2	-1.5
Mortalityrate ,%	15.2	14.6	14.7	-0.5
Unemploymentrate ,%	4.3	3.7	4.2	-0.1
GRP per capita, thousand rubles	368.5	370.61	370.9	2.4
Fixed capital investments, mln. Rub.	283652.3	279212.5	298023	14370.7
Fixed assets in the economy (at full book value at the end of the year), mln.	1841669	2017216	2138249	296580
The volume of goods, works and services performed, mln.				
Including, mining	6282.7	7726.2	7667.2	1384.5
manufacturing industries	422943.6	448223.4	456393.7	33450.1
Agricultural products - total, mln. rubles	193876.1	219151.4	247838.6	53962.5
including crop production	120821.1	135376.9	154449.8	33628.7
animal husbandry	73055	837774.5	93388.8	20333.8
Commissioning of the total housing area,	1687.3	1691.1	1878.2	190.9

	thousandm <sup>2</sup>			
Retailtradeturnover, mln.	516648.5	55228.4	584810.7	68162.2
Retail trade turnover per capita, mln rub .	0.221	0.024	0.251	0.030

General indicators of the socio-economic situation in the region increase, which is confirmed by the growing volume of investment in fixed assets by 14370.7 million rubles, the growing volume of goods, works and services in the Extraction of minerals (by 1384.5 million rubles) and Manufacturing industries (by 33450.1 million rubles), the growing commissioned area of residential buildings (by 190.9 thousand m<sup>2</sup>), the growing amount of retail turnover (by 68162.2 million rubles).

In modern conditions, the problem of social security as a factor of living standards of the population is relevant (Prodanova & Zatsarinnaya, 2006). The analysis of the living standards of the population of Voronezh region is presented in Table 2.

**Table 2.** Living standards in Voronezh region

Index	2017	Oct 2018	Dec 2019	Deviation (+ ; -)
Average per capita cash income (per month), rubles.	29497.7	30288.5	32146.2	2648.5
Average subsistence level per capita, rubles per month	8034	8612	8894	860
Average monthly nominal accrued wages of employees of organizations, rubles.	28006.6	61206.8	33375.5	5368.9
Average size of assigned pensions, rubles.	12370.8	13137.3	13906.3	1535.5
The share of the population with monetary incomes below the subsistence level in the total population of the subject, %	9.1	8.9	8.9	-0.2
Ginny coefficient	0.399	0.4 00	0.406	0.007

In 2017-2019, the living standards of the population of Voronezh region were increasing. The average per capita money income per month increased by 2648.5 rubles and amounted to 32146.2 thousand rubles in 2019, which exceeds the subsistence minimum by 3.67 times in 2017, by 3.52 times in 2018 and by 3.45 times in 2019. The average monthly nominal accrued wages increased by 5368.9 rubles and amounted to 33375.5 rubles in 2019. The share of the population with income below the subsistence level was 9.1% in 2017, 8.9% in 2018 and 8.9% in 2019. The value of the indicators decreased by 0.2%. The degree of deviation of the total income distribution line from the even distribution line increased by 0.007 and was 0.406 in 2019 (Gini coefficient).

The food security assessment of Voronezh region is presented in Table 3.

**Table 3.** Indicators of food security for Voronezh region

Index	2017	Oct 2018	Dec 2019	Deviation (+ ; -)
Sowing area, million ha	2603. 2	2576.9	2638.5	35. 3
Livestock and poultry, million heads				
- cattle	463. 7	464.9	490.0	26. 3

- pigs	1169.3	1340	1419	249.7
- sheepandgoats	235.1	219.8	212.8	-22.3
Agricultural production, billion rubles	193.87	219.15	247.83	53.96
including crop production	120.82	135.38	154.45	33.63
animal husbandry	73.06	83.77	93.39	20.33
Production of agricultural products, thousand tons:				
- grains (in weight after processing)	5663.6	4764.1	5178.0	-485.6
- potatoes	1244.2	1117.0	977.6	-266.6
- vegetables	455.7	449	434.8	-20.9
- livestock and poultry for slaughter (slaughter weight)	287.6	348.9	536.7	249.1
- milk	841.5	904.8	981.9	140.4
- eggs, billion pcs.	947.9	983.8	757.9	-190.0
The level of self-sufficiency in food resources, %				
- potatoes	116.39	113.75	108.34	-8.05
- vegetables	95.74	94.79	92.38	-3.36
- milk and dairy products	40.16	47.95	73.37	33.21
- meat and meat products	379.05	406.29	440.51	61.46
- eggs	107.37	111.57	86.05	-21.33

The sown area increased by 35.3 million hectares and amounted to 2638.5 million hectares in 2019. The number of cattle increased by 26.3 million heads, of pigs – by 249.7 million heads. The number of sheep and goats decreased by 22.3 million and amounted to 212.8 million in 2019.

In value terms, the volume of agricultural production increased by 53.96 billion rubles and amounted to 247.83 billion rubles in 2019, which was due to an increase in crop and meat prices.

For grain, the volume of agricultural products decreased by 485.6 thousand tons; for potatoes – by 226.6 thousand tons, for vegetables – by 20.9 thousand tons, and for eggs – by 190 billion pieces. There was an increase in the volume of meat and milk production by 249.1 thousand tons and 140.4 thousand tons, respectively.

An indicator characterizing the food security of a region or country is the level of self-sufficiency in the main types of agricultural products, which reflects the extent to which its own production is able to satisfy all the needs or the so-called "domestic consumption" of the country or its regions (Kulikova, 2013; Rogovskaya & Filippov, 2018).

Voronezh region was self-sufficient in potatoes, meat, milk, and eggs. A low level of self-sufficiency was observed for vegetables. A decrease in the level of self-sufficiency of Voronezh region was observed for potatoes by 8.05%, for vegetables by 3.36%, and for eggs by 21.33%. The level of self-sufficiency in milk increased by 33.21% and in meat - by 61.46%.

The dynamics of consumption of basic food products and the compliance of the diet with the recommended norms are presented in Table 4.

**Table 4.** Consumption of basic food products and compliance with recommended diet norms, kg per person per year

Index	Threshold value	Feb 2016	2017	Oct 2018	2018 to 2016, %	2018 to the norm, %
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Consumption of basic food products per capita :						
- potatoes, kg	90	121	121	109	90.08	121.11
- vegetables and melons, kg	140	119	124	129	108.40	92.14
- meat and meat products, kg	73	92	94	95	103.26	130.14
- milk and dairy products, kg	325	271	270	273	100.74	84.00
- eggs, pcs.	260	339	339	341	100.59	131.15
- bread products, kg	96	135	135	134	99.26	139.58

The consumption of basic food products does not correspond to the recommended norms for vegetables and melons, milk and dairy products. The consumption of vegetables and melons per capita increased by 8.40%, of meat and meat products - by 3.26%, of milk and dairy products - by 0.74%, and of eggs - by 0.59%.

## 7. Conclusion

Having analyzed food security indicators of Voronezh region for 2017–2019, it can be concluded that vital interests of the population are protected. By the level of food self-sufficiency, the indicators exceed the threshold values established by the Doctrine of Food Security of the Russian Federation (Rodnina, 2020). Actual food consumption per capita does not fully comply with the rational norms. For certain products, consumption indicators can be low and high. The production of meat and crop products has a positive trend due to an increase in the number of animals and sown areas.

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