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## Food Security Problems and Imperatives of the North Caucasus Macro-Region Subjects

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**Abstract:**

*This article concerns the analysis of food security in the North Caucasian macro-region. Any State is faced the challenge to provide safe food of domestic production to its population. This task is particularly relevant due to the emergence of a series of challenges and threats for country food sovereignty and its solution is impossible without active state support. The subjects of the North Caucasus Federal District have been selected as objects for this research.*

*To identify the problems in country food security, the authors analyzed the global rating «The Global Food Security Index" of the world's states. The authors also studied the internal and the external, economic and political objective and subjective factors and the potential for food security of macro-region. The authors analyzed the dynamics of development of the main types of agricultural production, the self-reliance level and production of basic foods, norms and actual food consumption.*

*The authors show that with current sanctions and Russian anti-sanctions, there is a possibility of significant increase in agricultural production. The article draws conclusions on the significant differentiation of population per capita incomes by regions of the country and consumption of staple food. This study made it possible to identify the main problems and their impact on current Agro-Food market of the Russian Federation.*

*The study recommends measures to strengthen food security by operational regional monitoring and by defining the evaluation indicators system of the level of food security comparable to systems at the international level.*

**Keywords:** Food security, self-reliance level, agricultural production, per capita incomes, subsistence minimum, differentiation of consumption.

**JEL Classification Codes:** E27, E64, J31, Q18, R10.

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## **1. Introduction**

In the current context, one of the most important problems of country food security is to provide the population with sufficient and high-quality foods. Despite the positive results achieved in recent years in food security in Russia, "... *there are territories where the part of population has limited access to food and insufficient consumption of animal protein*" (FAO Report, 2014). The preconditions for food sovereignty and export outcomes of the main categories of food have worsened due to the introduction of economic sanctions against our country. In this regard, the food security aspect takes on particular urgency and significance.

The purpose of this work is to analyze the influence of resource potential and a complex of factors on food security state of the North Caucasian macro-region for development and justification of tools to enhance its level. As objects of research are subjects of the North Caucasus Federal District (hereinafter referred to as the NCFD), with a territory of 111,7 thousand km<sup>2</sup> (0.6%), population of over 9700 thousand people (6.6%) and high population density - more than 57 people for 1 km<sup>2</sup>.

## **2. Theoretical, Empirical and Methodological Grounds of the Research**

The authors have analyzed the standard setting instruments, they have used the data from the Federal State Statistics Service of the Russian Federation, current information from the Ministry of Agriculture of the Russian Federation, data from international organizations and several scientific articles. The research was carried out based on the systematic approach and the comparative analysis method.

## **3. Results**

By considering approaches to evaluate food security, it should be noted that food security has traditionally been the object of interest of international organizations and intergovernmental bodies. There are different ways of ranking countries on the level of food security. Currently, the most comprehensive set of indicators of food security state in different countries of the world is a global study titled «*The Global Food Security Index*». Since 2012, the British «*The Economist Intelligence Unit*» conducts the study with the support of the American multinational company Dupon.

The index measures states policy and effectiveness of their institutions in food security. In the study of the biennium, there is an analysis of 28 indicators of three major groups of food security in the world: 1) the access and consumption level of food; 2) the availability and sufficiency of food products; 3) the quality and safety level of food (Stroeva *et al.*, 2016).

In 2016, based on the analysis of the indicators of 113 countries of the world, the final rating of food security was compiled as shown in Table 1.

**Table 1.** *The Global Food Security Index, 2016 (Global food security index, 2016)*

Rating	State	Index
1	The United States of America	89,0
2	Singapore	88,2
3	Ireland	85,4
4	Austria	85,1
5	Netherlands	85,9
42	China	65,5
46	Belorussia	63,1
48	Russia	62,3
113	Burundi	24,0

The rating of Global food security index in Table 1 is a scale from 0 to 100, where 100 is total security. The obtained results of the Index are for further use by countries as a tool for analyzing socio-economic policy issues and developing measures to improve the situation. The data collected suggest that the Russian Federation is significantly behind the leaders of the rating, ranking 48th out of 113 countries, which indicates that there are serious problems in the country's food security.

In the Russian Federation, food service providing is a basic element of economic, social and political security of the country. The agro-industrial complex of the state, which ensures the food security, is one of the most important factors in the development of the national economy system. About 5.1% of GDP and 6.9% of the state workforce fall to agribusiness, and the country can be completely independent of other states only if it has sufficient food resources. This topic is particularly relevant under the current circumstances of economic sanctions of 2014-2015 and the embargo on the supply of certain types of food products imposed by the EU countries and the United States of America against Russia.

Traditionally, a number of indicators are used in food security assessing; the main agricultural production, the specific weight of domestic products in the total commodity resources, the population's average incomes per capita, economic and physical availability of food. Let us examine the production dynamics of the main types of agricultural products as shown in Table 2 (Dudnikov *et al.*, 2017).

**Table 2.** *Production of the main types of agricultural products in the Russian Federation, 1990-2015, million tons (GKS, 2016)*

Agricultural products	1990	2000	2005	2010	2012	2013	2014	2015
Meat and meat	10,11	4,45	4,99	7,17	8,09	8,5	9,0	9,07
Milk and dairy	55,7	32,3	31,1	31,8	31,8	30,5	30,8	30,8
Eggs, billion pieces	47,5	34,1	37,1	40,6	42,0	41,3	41,9	42,6
Sugar beet	32,3	14,1	21,3	22,3	45,1	39,3	33,5	36,0
Sunflower	3,43	3,92	6,47	5,34	7,99	10,6	9,03	8,9
Potato	30,9	29,5	28,1	21,1	29,5	30,2	31,5	33,3

Vegetables	10,3	10,8	11,3	12,1	14,6	14,7	15,5	15,9
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The above Table shows that since the 2000s production of the main types of agricultural products has gained positive dynamics in the range of 10-15%. At the same time, taking into account the inflation factor and the increase in price, it would be wrong to state that the production growth was significant. Let us examine in details the dynamics of self-reliance level of the population as shown in Table 3.

**Table 3.** Dynamics of self-reliance level in the Russian Federation by the main agricultural product, % (GKS, 2016).

Food products	2010	2011	2012	2013	2014	2015
Grain	93,3	135,9	108,3	140,4	151,5	99,2
Meat and meat products	72,2	74,2	76,1	78,5	82,8	88,8
Milk and dairy products	80,5	81,5	80,2	77,5	78,6	80,4
Eggs	98,3	98,0	98,0	98,0	97,6	98,2
Sugar	85,3	124,6	95,1	101,2	98,5	94,6
Potato	101,0	113,0	97,5	99,4	101,1	105,1
Vegetables and gourds	80,5	93,2	88,7	88,2	90,2	93,7

The data from Table 3 shows that for the last 5 years they have been revealed the positive dynamics of self-reliance level growth in agricultural products by main types of food. In 2015, despite a slight decrease in production of grain and sugar, the production of other agricultural products increased, due to the export outcomes policy in response to sanctions. The norms of food self-reliance were achieved actually on all indicators; potato production (105.1% to 95%), grain (99.2% to 90%), eggs (98% to 80%), meat (88.8% 85%). The standards of self-reliance for milk and dairy products were not reached by 10% (80% instead of the necessary 90%).

The optimal balance of domestic production and share of imported food products that have an impact on price formation and their economic accessibility are essential for food security. Let us analyze the dynamics of export and import of food products and agricultural raw materials in Russia as shown in Table 4.

**Table 4.** Dynamics of export and import of food products and agricultural raw materials in Russia, 2005-2015, mln. dollars. (GKS, 2016; 2017a).

Indicators	2005	2010	2011	2012	2013	2014	2015
Export, mln. dollars.	4492	8755	13330	16663	16228	19035	16217
Import, mln. dollars.	17430	36398	42535	40384	43165	39985	26598
External trade surplus, mln. dollars	12938	27643	29205	23721	26937	20950	10381

The calculations in Table 4 show that from 2005 to 2013, there was a significant predominance of imports of food resources over exports by the absolute majority of food groups. In particular, import of food products and agricultural raw materials in dynamics since 2010 increased from \$17.4 billion to \$43.2 billion in 2013 (by

59.7%). Russian importers began to import more dairy products, raw sugar, vegetable tropical oils and various types of vegetables. However, in 2014-2015 in connection to the sanctions, the indicators have significantly decreased. Import decreased by 33.5% as compared to 2014 and amounted to \$26.5 billion. It was noted the physical volume reduction of agricultural exports by 14.2% to \$16.2 billion and decrease of external trade surplus by 50.5%.

The sanctions and retaliatory counter-sanctions led to the need for re-orientation of food imports from other countries, which increased price. Nevertheless, in the absence of problem of physical access to food in Russia, there are threats to food security in terms of economic access to food. In the Food Security Doctrine, the economic access is defined as *«the ability to buy food products on current prices in volumes and assortments that are not less than the established rational consumption norms»*. Food security is considered as achieved when each person can consume according to rational norms.

In the international practice, the share of household spending on food is the crucial importance to food security and one of the general indicators of the standard of living. If the expenditure on food is more than 10-15% of family budget income, the country considered poor, and the population is low-income. With the improvement in the living standard, the share of costs on food decreases, which allowed the population to spend more on health, recreation, etc. Our comparative analysis reveals that in 2015, the share of spending on food in the leading foreign states was: in Luxembourg 8.7%, in the Netherlands 10%, in the UK 11%, and in general the population of the more prosperous developed countries with high incomes of people spends on food in recent years about 15% of the total consumer spending of the family. Moreover, in Europe today there are states where the cost of food in families is on average less than the cost of leisure and cultural entertainment.

The situation is different in less rich countries, the spending on food can be 40-50% of the total family budget. That was due to low people incomes and the need, primarily, to achieve to physiological nutrition needs, which makes it impossible to realize significant expenditures on medicine, education and recreation. It is the inhabitants of such states that suffer from food inflation, the rise in food prices, increasing the already high share of food expenditures.

The consumer spending on food directly depends on real money income, with changes in consumer prices on products of food and agricultural companies. The average monthly income of worked family members, receiving social benefits and pensions influence the average per capita income. From the point of view of consumption, the influence of all factors on food security is assessed with three indicators: 1) the ratio of the minimum wage, the income purchasing power, the average monthly wage to the subsistence level and the minimum pension; 2) the actual per capita consumption of basic foodstuffs; 3) the accordance of consumption level of basic foodstuffs by people with rational consumption norms. In turn, per

capita income affects the actual consumption of food by each person in accordance with the norms of rational nutrition. Let us imagine the dynamics of socio-economic indicators of the population's standard of living to analyze the influence of these factors on food security as shown in Table 5 (Shagayda and Uzin, 2016).

**Table 5.** Dynamics of average per capita monetary incomes of the population of the Russian Federation and the North-Caucasian Federal District for 2005-2015, rubles (GKS, 2016).

Subjects	2005	2010	2011	2012	2013	2014	2015	Place
The Russian Federation	8000	18958	20780	23221	25928	27776	30446	...
NCFD	4537	13253	15050	17167	18900	20 693	23023	8
The Republic of Dagestan	4388	15678	18278	20730	21717	23423	26739	32
The Republic of Ingushetia	2737	9630	11562	12322	13821	14346	14683	84
Kabardino-Balkaria	4190	11290	12636	13717	15297	16619	19108	75
Karachay-Cherkessia	4084	10878	11742	13388	14664	16109	17255	81
The North Ossetia-Alania	4669	13193	13757	16165	17788	19820	22007	66
The Chechen Republic	...	11982	14026	15274	17188	19788	22914	51
Stavropol region	5117	13016	14440	17088	19768	21590	22971	56

Table 5 demonstrates that in NCFD the real monetary income of the population in 2015 amounted to 157.5% to the level of 2010. At the same time, this indicator in the district is lower than the national average by 24.3%. In addition, a significant part of people, about 18.1% or 1.623.9 thousand people have income below the subsistence level. If in 2015, in comparison to 2010, across the country there was an increase in the proportion of the population with incomes below the subsistence minimum from 12.5% to 13.3%, according to the subjects of NCFD, the value of the indicator on average reached 18% as shown in Table 6 (Shagayda and Uzin, 2016).

**Table 6.** Proportion of the population of the Russian Federation and the subjects of NCFD with incomes below the subsistence level of 2010-2015, % (GKS, 2016).

Subjects	2010	2011	2012	2013	2014	2015
The Russian Federation	12,5	12,7	10,7	10,8	11,2	13,3
The Republic of Dagestan	8,8	8,3	7,0	10,1	10,1	11,0
The Republic of Ingushetia	22,1	18,5	17,1	19,5	24,9	31,9
The Republic of Kabardino-Balkaria	15,7	15,3	14,2	18,6	18,5	21,0
The Republic of Karachay-Cherkessia	17,7	18,8	16,0	19,5	19,4	23,6
The North Ossetia-Alania	10,5	12,6	10,4	12,1	12,1	14,1
The Chechen Republic	...	...	21,7	19,7	14,2	15,9
Stavropol region	18,5	18,3	13,7	11,8	11,6	13,5

Data in Table 6 show that poverty rates in the national Republics of the North Caucasus reached higher figures: Ingushetia 31.9%, Karachay-Cherkessia 23.6%, Kabardino-Balkaria 21.0%. In addition, the unemployment rate in macro-region is high. In 2015, in the North Caucasus, the number of unemployed people reached 19.8% or 498.8 thousand people, with the average Russian indicator being 5.8%, which led to more intensive outflow of economically active people to other regions of the country. In particular, in Russia, the number of dropouts was 45.4% of the total number, in the NCFD 56.0%, including 71.3% for Kabardino-Balkaria; North Ossetia 71.1%; Karachay-Cherkessia 61.3%; Dagestan 60.1%; Chechnya 57.6%. The analysis suggests a conclusion that with sufficient resource potential, in macro-region the economic growth rate was low, the real economic sector is underdeveloped, the real income of the population is low, unemployment is growing and, accordingly, the worsening of financial situation of the population as shown in Table 7.

**Table 7.** Dynamics of average per capita monetary food expenditures of the population of the Russian Federation 2005-2015 (GKS, 2016).

Indicators	2005	2010	2011	2012	2013	2014	2015
Nutrition costs per capita in month, rubles.	1765	3738	3959	4259	4465	5154	5700
Food expenditures of the population of the Russian Federation, billion dollars	\	5801	6429	6889	7392	11505	12597

The performed analysis of the dynamics of average per capita monetary expenditures of the population based on data in Table 3 allows us to conclude that the population's spending on the purchase of food products has sharply increased. Therefore, in 2015, the expenditures of the population of the Russian Federation on food and nutrition costs per capita increased in comparison to 2005 by more than 3 times, compared to 2013 by 21.7%, compared to 2014 by 11%. The loss of purchasing power of essential part of the country's population, in the amount and quality of food corresponding to the recommended medical standards, was due to a noticeable price increase as shown in Table 8.

**Table 8.** Economic food availability by average consumer prices for certain types of food products 2015, rubles / kg (GKS, 2016).

Food products types	Prices 2015, rbl./kg	Changes 2015/2014, %
Beef	314,9	15,7%
Pork	271,1	-0,5%
Chickens	133,7	-1,8%
Frozen fish	138,2	24,9%
Dairy butter	397,8	11,2%
Sunflower oil	107,6	37,8%

Milk, L.	47,6	8,7%
Hard and cream cheeses	418,6	7,7%
Hen eggs, for 10 pcs.	65,0	10,7%
Bread and baked products	64,8	10,3%
Potato	19,9	-25,3%
The average monthly nominal wages, rbl.	34 029,5	4,7%
The cost of minimum food basket	3 589,9	8,9%

Data from Table 8 demonstrates that, in general, in 2015 the economic affordability of foodstuffs deteriorated. The cost of minimum food basket grew faster than the average monthly nominal wage (8.9% and 4.7%, respectively). In addition, it should be noted that the growth of population's income was in a less mobile range than the price movements on the market of food products and services. Thus, the annual price growth on the food market averaged 19%, while the growth in real income of the population on annualised basis decreased by -0.7% in 2014, by -3.2% in 2015, and by -5.9% in 2016. These tendencies were the limiting factors of the consumer demand growth and hampered economic growth in the agribusiness sectors.

Thus, in addressing the issue of the economic affordability of foodstuffs, it should be noted that according to the Russian Federal State Statistics Service, over the past two years, the share of food products in the structure of consumer spending exceeded 35.3% (GKS, 2017b). According to the monitoring data of the Russian Presidential Academy of National Economy and Public Administration, the monthly nutrition costs of the population in 2015 amounted over 50% on average in the country, the situation in the North Caucasus Federal District is more critical as shown in Table 9 (Shagayda and Uzun, 2016).

**Table 9.** The specific weight of food products in the structure of consumer spending in the RF and NCFD for 2005-2015, % (GKS, 2016).

Subjects	2005	2010	2011	2012	2013	2014	2015
The Russian Federation	36,1	32,9	32,6	31,4	31,2	31,9	35,3
The Republic of Dagestan	50,1	39,6	43,5	40,7	39,3	41,2	43,5
The Republic of Ingushetia	62,8	61,0	65,5	62,8	64,8	50,2	47,1
The Republic of Kabardino-Balkaria	45,9	39,4	39,0	33,5	32,9	36,7	40,6
The Republic of Karachay-Cherkessia	40,8	49,9	40,8	41,3	40,8	41,0	39,2
The North Ossetia-Alania	40,5	36,7	35,6	35,8	32,0	35,9	36,9
The Chechen Republic	...	53,4	57,7	59,1	50,5	38,2	42,4
Stavropol region	32,1	32,8	38,5	36,1	28,8	34,1	34,6



Data in Table 9 shows that the food expenditures of the population of the NCFD in 2015 amounted to more than 43.5% of their budget (with average European level 10-15%), which is an indicator of a low standard of living. However, a high level of spending on food does not mean that people buy the food they need. As a result, their diet consists mainly on cheaper food. On average, according to the NCFD, the economic accessibility of food products was 80.2%: the Chechen Republic 47.9%, Ingushetia 34.7%.

One of the main criteria of nutrition quality of the population is in accordance the structure of consumed food with rational norms. During this investigation, as criteria it is considered the achievement of specific standards for products consumption, among which the following are generally accepted: minimum standards established by the decree of the Government of the Russian Federation from August 12, 2005 No 511; sustainable consumption norms adopted by the Russian Federation Ministry of Health from August 2, 2010, No. 593; sustainable consumption norms adopted by the Russian Federation Ministry of Health from August 14, 2016 No. 614; the UNO World Health Organization norms as shown in Table 10.

**Table 10.** Food consumption norms recommended by the Ministry of Health of the Russian Federation and WHO, per capita per year, kg

Food products	Decree of the RF Government 12.08.2005 № 511	The RF Ministry of Health 2.08.2010 №593	The RF Ministry of Health 14.08.2016 №614	UNO WHO norms
Meat and meat products	37,2	75	73	78,0
Milk and dairy products	238,2	340	325	405
Vegetable oil	13,8	12	12	9,1
Fish and fishery products	16	22	22	18,2
Eggs, pcs	200	260	260	291
Sugar and pastries	22,2	28	24	47,1
Bread and bakery products	134	105	96	117,0
Potato	107,6	100	90	117,0
Vegetables and gourds	97	140	140	140,0
Fruits	23	100	100	80,3

The interpretation of these standards is simply enough and corresponds to modern realities. So, the minimal consumption norms are used in Russia, mainly for statistical purposes in computing the level of inflation and indexation of pensions and benefits. The rational norms reflect the level of modern consumption in the Western European countries - members of the European Union. The moving up to UNO WHO norms means accordance with modern consumption in developed foreign countries. The achievement of specific standard naturally determines the level of the country's food sovereignty. Let us make a comparative analysis of the dynamics of staple food consumption per capita of the RF based on the data of Table 11.

**Table 11.** Dynamics of staple food consumption by the Russian Federation population, per capita per year, kg (GKS, 2016)

Food products	Consumption in the Russian Federation						Consumption in the USA
	1990	2011	2012	2013	2014	2015	2015
Meat and meat products	74	65	68	69	69	67	118
Milk and dairy products	399	246	249	248	244	239	276
Vegetable oil	6,6	13,5	13,7	13,7	13,8	13,6	31
Fish and fishery products	20,3	23,0	24,8	24,8	22,8	19,8	23
Eggs, pcs	291	271	276	269	269	269	263
Sugar	32	38	40	40	40	39	59
Bread and bakery products	123	119	119	118	118	118	152
Potato	117	110	111	111	111	112	56
Vegetables and gourds	81	106	109	109	111	111	113
Fruits	41	60	61	64	64	61	99

Data in Table 11 shows that in connection with the sanctions and counter-sanctions in 2015 compared to 2014, the staple food consumption per capita has decreased. In particular, meat consumption was 97.1% of the norm, fish 79.8%, milk and dairy products 70%, fruits and berries 67.4%. At the same time, sugar consumption rates were exceeded by 30%, bread 18%, vegetable oil 13%, potato 12%. Due to a reduction in purchasing power of a substantial part of the country's population, insufficient economic access to food was traced.

#### 4. Conclusions and recommendations

Thus, our study demonstrated that the issue of food security is a complex problem related to sustainable macroeconomic development, the need to promote efficiency in the agro-industrial sector, the implementation of social policy, the improvement of population standard of living. The food supply of the Russian Federation population represents a basic element of the economic and national security of the state. Therefore, the study and analysis of food security problems is one of the most popular areas of modern Russian economic science. During study process, we revealed the following features of Russia's food security:

- First, the introduction of food counter-sanctions and an attempt to accelerate the ex-post outcomes of food did not lead to faster growth in the production of domestic food.
- Second, the growth of consumer prices adversely affects the living standards of people: a decrease in real population incomes, consumption of food products and significant increase of the spending level on food.

- Third, despite a certain increase in the consumption of certain types of food, the nutrition structure of the Russian population as a whole does not correspond to rational consumption norms.
- Fourth, in order to implement governmental policy in ex-post outcomes, it is necessary to create infrastructure and financial conditions for import substitution and a creation of the conditions for own production in the most import-dependent sectors.
- Fifth, it is important to conduct operational monitoring of food security state in the country and economic access to food by regions, groups of people with different incomes.
- Sixth, we consider it essential to develop the indicators system for assessing food security comparable to the systems of the international level and the approaches of FAO in specific areas, which will allow to identify the state of food security in Russia and the world and to monitor the adequacy of international assessments.
- Seventh, in order to ensure food security of the North Caucasus Federal District subjects, it is necessary to create infrastructure and financial conditions for import substitution and development of the country's own production facilities.
- Eighth, to increase the purchasing power of low-income families and stimulate agricultural production, it is necessary to develop a system of targeted State support in the form of tax credit for earned income and assistance for supplementary food.

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