

Comparative Analysis of Food Security in the Republic of Uzbekistan

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Abstract

This article provides an econometric analysis of the food security situation in the Republic of Uzbekistan, as well as the necessary statistics. The analysis examines the level of food security in the country and makes suggestions and recommendations on existing problems.

Keywords: *food security, hunger, poverty, agriculture, population growth rate, consumption rate, export-import, descriptive statistics, correlation matrix, variance, Fisher criteria, the result factor.*

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Introduction. The quality of life of the world's population depends on the extent to which they are provided with quality food. Each country solves this problem in different ways, depending on its climatic conditions, land fertility, intensive agriculture, and the level of industrial development. However, countries with backward economies and large populations are still struggling to cope with food shortages. As a result, malnutrition, hunger, poverty, and destitution are on the rise. Uzbekistan rose from 80th to 71st place in the global food security rankings. In 2019, Uzbekistan ranked 49th in the global hunger index with 10.7 points, [1] in 2020 it ranked 30th out of 107 countries in this index with 6.7 points rise. [2]

In order to further ensure food security of the country, fill the market with quality, safe and affordable food, strengthen the purchasing power of the population, liberalize foreign economic activity and develop a healthy competitive environment, as well as eliminate existing systemic problems in this field, the President of the Republic of Uzbekistan PF-5303 dated 16.01.2018 "On measures to further ensure food security of the country" was adopted. [3]

Food security is at the heart of Uzbekistan's socio-economic policy. Ensuring food security is a guarantee of improving the quality and quality of life of the population, ensuring the independence of Uzbekistan, socio-economic and political stability in the country. In the "Action Strategy for the five priority areas of development of Uzbekistan in 2017-2021" "Modernization and accelerated development of agriculture: deepening structural changes and the gradual development of agricultural production, Further strengthening food security, expanding the production of environmentally friendly products, significantly increasing the export potential of the agricultural sector"[4]. In this regard, the President of the Republic of Uzbekistan Shavkat Mirziyoyev in his address to the Oliy Majlis said: 5], - he pointed out. This underscores the importance of food security.

Materials and methods. In the study of this article, reference was made to the necessary statistical data. The article also used comparative mathematical analysis and statistical-econometric methods. The degree of closeness of the results to reality was checked using the fisher criterion.

The term food security came into international circulation after the grain crisis of 1972-1973. During this period, surplus food production occurred in developed countries. This problem has begun to be discussed in the world community. These discussions are in line with the United Nations Food and Agriculture Organization's December 1974 UN Security Council resolution on the prevention of famine in third world countries. International Obligations to Ensure Security". However, the document does not define the term food security.

A study of the scientific literature on food safety suggests that the concept first came into use in the 1970s. Later, the concept expanded in meaning. There are various approaches in the economic literature to define the concept of "food security". The most common definition of food security is that all people have adequate physical and economic access to the safe food they need to live an active and healthy life at any time. [6] According to this definition, food security is ensured through the physical and economic achievement of safe and adequate amounts of food.

Discussion. The level of food consumption in the Republic of Uzbekistan is primarily related to the demographic situation in the country. The general demand for food is formed depending on the age and sex status and changes of the population. If we look at the dynamics of population growth in our country, there is a growing trend. Due to the high birth rate in the country, young

children, youth and middle-aged people make up the bulk of the population. It is between these layers that the need for food, especially its quality and quantity, becomes particularly strong due to the high caloric energy expenditure. Below we can see the growth rate of agricultural production in relation to the population of our country using table numbers (Table 1). [8]

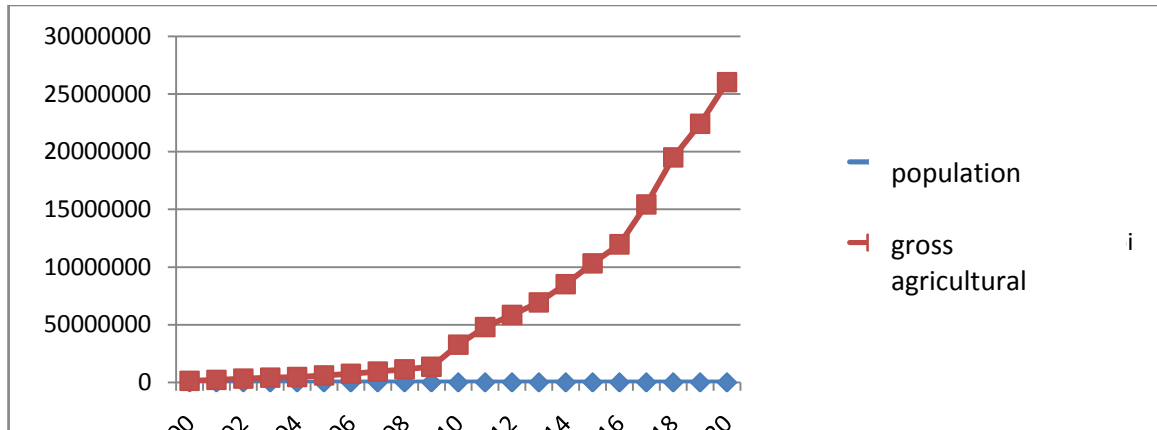


Figure 1. Dynamics of growth of agricultural production in accordance with the population of the Republic of Uzbekistan.

Using the indicators in the table, we can focus on the following dynamics (Figure 1) [7]. We can see that the growth rate has accelerated, and as a result, the amount of agricultural products grown in 2017-2018 was 10, 11 times. This growth rate can be explained by the increase in the number of hectares of agricultural land, as well as the amount of investment in this sector and the volume of exports.

Table 1. Population of the Republic of Uzbekistan and the growth rate of agricultural production

Regions	Years	Gross agricultural output, (mln. Soums)	Population (mln.persons)	age of the population	Population growth rate
Republic of Uzbekistan	2000	1 387 245,80	24487,7	56,65071852	-
	2001	2 104 835,00	24813,1	84,82757092	0,281768524
	2002	3 255 324,10	25115,8	129,6125984	0,447850275
	2003	4 083 339,90	25427,9	160,5850228	0,309724243
	2004	4 615 816,00	25707,4	179,5520356	0,189670129
	2005	5 978 337,90	25707,4	232,5531909	0,530011553
	2006	7 538 774,60	26312,7	286,5070707	0,539538798
	2007	9 304 857,80	26663,8	348,9696817	0,62462611
	2008	11 310 718,10	27072,2	417,7982617	0,688285799
	2009	13 628 632,30	27533,4	494,9854468	0,771871851
	2010	32 746 521,90	28001,4	1169,460166	6,744747195
	2011	48 068 344,80	29123,4	1650,505944	4,810457774
	2012	58 549 266,90	29555,4	1981,00066	3,304947161
	2013	69 391 323,40	29993,5	2313,545381	3,325447217
	2014	85 101 685,70	30792,8	2763,6878	4,501424189
	2015	103 301 974,90	31022,5	3329,904905	5,662171041
	2016	119 726 684,80	31575,3	3791,78297	4,618780651
2017	154 369 402,70	32120,5	4805,946442	10,14163473	

	2018	195 095 553,20	32656,7	5974,135574	11,68189132
	2019	224 265 855,60	33255,5	6743,722259	7,695866855
	2020	260 306 815,00	34000,8	7655,902655	9,121803958

The fruit and vegetable sector in Uzbekistan is an important segment in ensuring food security in the country and the region. Therefore, all to accelerate the development of fruit and vegetable production in this area measures are being taken, and they are paying off. The following is the dynamics of the export-import structure of food products (Table 2) [8]

Table 2. Export-import dynamics of food products by years (January-December, mln. USD)

	2000 year	2005 year	2010 year	2015 year	2018 year	2019 year	2020 year	Difference 2000- 2020 y
Eksport	176,4	206,1	1260,5	1316,4	1097,7	1336,3	1436,4	1260
Import	361,1	287,2	963,2	1585,3	1581,6	1851,3	1608,5	1247,4

The main export markets for fruits and vegetables are the Russian Federation, Kazakhstan, the Kyrgyz Republic and Pakistan. The share of fruits and vegetables in exports was 6.7% due to the government's focus on agricultural and horticultural development. The largest value-added exports of fruits and vegetables are in Kazakhstan (25.3% of total fruit and vegetable exports), which is 5.2 times more than exports to Afghanistan.

Table 3. Fruit and vegetable exports (January-December 2020, USD million)

Indicators	2018		2019		2020		3-year average growth rate	
	Mln. U.S. \$	A thousand tons	Mln. U.S. \$	A thousand tons	Mln. AQSh \$	Mln. U.S. \$	A thousand tons	Mln. U.S. \$
Total	874,5	1230,6	1200,0	1400,0	1008,6	1485,0	1027,1	1371,86
Fruits and berries	357,7	-	406,8	-	353,9	402,3	372,8	-
Grapes(fresh picked)	238,5	-	328,3	-	133,1	140,5	251,5	-
Grapes(dried)					55,1	40,9	-	-
Melon and watermelon	6,5	-	13,1	-	25,6	105,6	15,06	-
vegetables	318,9	-	542,4	-	400,0	768,3	420.43	-
Peanuts	22,9	-	14,4	-	16,5	12,9	17,93	-
Pepper	-	-	-	-	13,8	13,7	-	-
Potatoes	-	-	-	-	0,4	0,7	-	-

(Table 3) Analyzes the composition of fruit and vegetable exports, with an average growth rate of \$ 1,027.1 or 1,371.86 thousand tonnes between 2018 and 2020. [9]

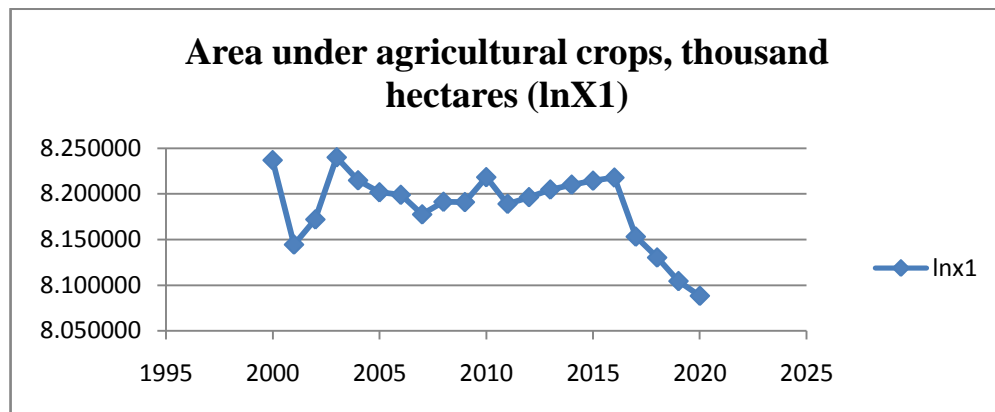


Figure 2. Dynamics of changes in the agricultural area of the Republic of Uzbekistan.

The graph below (Figure 2) shows the dynamics of the area under agricultural crops over the years. We see that between 2016 and 2020, arable land will shrink by an average of 112,575,000 hectares. [10]

Results. Using the above statistical comparative figures, we examine 3 factors influencing the growth rate of agricultural products between the respective econometric models and analyze the results.

The decline in agricultural land area in recent years can be explained by the use of land to build housing and industrial bases, as well as the loss of fertile land due to salinization of agricultural land and other technical reasons.

Table 4. Descriptive statistics

	LN1	LN2	LN3	LN4
Mean	17.01028	8.185594	8.033334	6.682668
Median	17.30431	8.196464	8.044979	6.274008
Maximum	19.37737	8.240148	8.208301	9.799543
Minimum	14.14283	8.088378	7.779885	4.784989
Std. Dev.	1.677737	0.040684	0.142208	1.716194
Skewness	-0.132317	-0.973323	-0.356202	0.490681
Kurtosis	1.631394	3.180568	1.766108	1.815762
Jarque-Bera	1.700223	3.344284	1.776257	2.069806
Probability	0.427367	0.187844	0.411425	0.355261
Sum	357.2159	171.8975	168.7000	140.3360
Sum Sq. Dev.	56.29602	0.033103	0.404460	58.90645
Observations	21	21	21	21

The multivariate econometric model of the relationship between the value of gross agricultural output and the factors influencing it is equal to the following function:

$$Y = - 34,47 - 1,49lnx1 + 7,65lnx2 + 0,34lnx3 \quad (1)$$

$$R2 = 0.983847131 \quad R \text{ (average)} = 0.980996636397707 \quad (2)$$

According to this model (1), the fixed capital investment (X3) is one billion. The increase in UZS will increase the value of gross agricultural output (Y) by 0.34 billion sums. The increase in the number of people employed in agriculture per 1,000 people increased the value of gross agricultural output (Y) by 7.65 billion soums. An increase in the sum and a decrease in the area under agricultural crops by 1,000 hectares will increase the value of gross agricultural output (Y) = 1.49 billion sums. It can lead to a decrease in the sum. (Table 4) [11]

The regression value in the model is $R^2 = 0.98384713$, when flattened R (average) = 0.980996636397707. This means that the outcome factor is inextricably linked to the factors included in the model. That is, 98.38% of changes in the value of gross agricultural output are due to factors included in the model, and the remaining 1.62% are due to factors not taken into account.

In the model, the correlation of factors is strong and the factors are chosen correctly. The standard error 0.231280525928415 is very small and is acceptable for the factors in the model.

Table 5. Correlation table

	<i>Ln_y</i>	<i>lnx₁</i>	<i>lnx₂</i>	<i>lnx₃</i>
<i>Ln_y</i>	1			
<i>lnx₁</i>	-0,456825755	1		
<i>lnx₂</i>	0,977241326	-0,343571859	1	
<i>lnx₃</i>	0,957817081	-0,5678627	0,908250962	1

If we analyze the data in this table, the resulting factor is the value of gross agricultural output (Y) in comparable prices in 2020 and the factors influencing it *lnx₁*, *lnx₂*, *lnx₃* indicators mutually specific correlation where the area under agricultural crops (X1) (-0.456825755) is inversely correlated with the gross national product of agriculture, the occupations in agriculture (X2) - (0 , 977241326) and investment in agriculture (X3) - (0.957817081) are strongly intertwined. The double correlation coefficients are inversely proportional to the number of people employed in agriculture (-0.343571859) and the ratio of agricultural investment (-0.5678627) to the number of people engaged in agriculture (-0.343571859). inversely strongly connected. We can see that there is a strong correlation between the number of people employed in agriculture (X3) and investments in agriculture (0.908250962). (Table 5) [12]

Table 6. Analysis of variance

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Fisher mezon</i>
Regressiya	3	55,38667294	18,46222431	345,1484209	2,00708E-15
Qoldiq	17	0,909341588	0,053490682		
Jami:	20	56,29601453			

F - The actual value of the Fisher criterion (Fhisob) is compared with the critical (Fjadval) value of the criterion. If $F_{hisob} > F_{jadval}$, then the defined model is significant. (Table 6) [13]

The Fisher criterion 2.00708E-15 is a very small number, which means that the resulting multi-factor regression equation is statistically significant.

Agriculture is a leader in food security. Therefore, in the selected model, the dependence of the area of agricultural crops on the gross agricultural output, the number of people engaged in agriculture, the amount of investment in agriculture was examined econometrically. According

to the results, the strongest factor is the area under crops, if the reduction of arable land per thousand hectares increases the value of gross agricultural output (Y) = - 1.49 billion. soums. According to this model, one billion investments in fixed assets will be made. increase in the value of gross agricultural output (Y) = 0.34 billion soums. soums, an increase in the number of people employed in agriculture per thousand people will increase the value of gross agricultural output (Y) = 7.65 bln. leading to an increase in the sum.

Conclusion. Given that all the indicators based on the developed model are close to reality and have high reliability and validity, the further implementation of this model will help to achieve positive results. In modeling the state of food security in the country, increasing the quantity and quality of gross agricultural output will help increase not only the domestic needs of the population, but also the export potential of foreign markets. On this basis, in addition to the state budget for measures to improve the reclamation of irrigated lands in the cultivation of gross agricultural output, attract long-term (10-15 years) investment loans from commercial banks, a grace period of at least 5 years for repayment of the main loan It is advisable to apply and introduce the practice of reimbursing at least 50% of loan interest payments to commercial banks from the state budget. In addition, to stimulate the number of people working in the sector, to introduce a reliable pension for workers registered in individual and joint farms, to introduce social assistance packages for low-income workers. It is important to increase the number and quality of workers in the network on a sustainable basis.

The mechanism of food security in the Republic of Uzbekistan is based on three important aspects: regulation and promotion of food production in the agro-industrial complex, ensuring access to and consumption of food products and capacity building, and improving the system of food security management. The following support and measures are effective:

- Establishment and improvement of the legal, regulatory framework for food security;
- Encouraging the development of food production through the budget. This includes tax benefits, subsidies and subventions;
- Stimulation of food production through monetary policy support. This includes the introduction of a system of preferential lending;
- support for food producers. It will support and encourage farmers, ranchers and landowners, enterprises, food industry enterprises that produce agricultural products.
- Mea In order to achieve the consumption of basic foodstuffs at the level of rational norms, it is necessary to accelerate the development of agriculture, food and processing industries, and further increase the consumer culture of the population. It is expedient to further increase the volume of agricultural food production in the Republic of Uzbekistan and accelerate its growth, to introduce practical experience of foreign countries in achieving high production efficiency.

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 14. sures such as customs tariffs and non-tariff regulation of food exports and imports.