



## METHODS OF SUSTAINABLE FOOD SUPPLY SYSTEM DEVELOPMENT

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Article history:	Abstract:
<b>Received:</b> September 1 <sup>st</sup> 2022	Economic stability is a particularly rare socioeconomic phenomena. This is a pressing issue in the Agro-industrial Complex core, which is particularly vulnerable to external forces. On this basis, the paper investigates the peculiarities of food supply networks. Statistical indices of agricultural and agrarian food market sustainability in the Republic of Uzbekistan were examined, and conclusions were formed
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### INTRODUCTION

In the Decree of the President of the Republic of Uzbekistan dated January 28, 2022 No. PF-60 "On the Development Strategy of New Uzbekistan for 2022-2026" implementation of the Food Industry Development Program as one of the main goals acknowledged. According to the program, it is planned to develop and implement a program to expand the base of food raw materials and gradually increase the volume of organic products. In 2022, the implementation of 50 large projects with a total value of 440 million US dollars within the framework of the State Investment Program; By 2026, the goal is to increase the volume of food products to 7.4 million tons, the processing level of milk to 32 percent, meat to 25 percent, and fruits and vegetables to 28 percent.

Also, the Decree of the President of the Republic of Uzbekistan dated 23.10.2019 No. PF-5853 "On approval of the strategy for the development of agriculture of the Republic of Uzbekistan for 2020-2030" establishes the safety of food products. development and implementation of the state policy of food security, which provides for the provision and improvement of the consumption ration, the production of the required amount of food products; issues of reducing state participation and introducing mechanisms to increase investment attractiveness in the field, which involves increasing the flow of private investment capital to support the modernization, diversification and sustainable growth of the agricultural and food industry defined as a top priority.

Based on the above, sustainable development of the food supply system in our country is the most difficult issue in the current conditions. In this regard, there was a need to analyze the quality of agricultural development using performance indicators to determine the main factors affecting the sustainable development of the system.

The main goal of our research is to determine the ways of sustainable development of the food supply system in our country. Based on this, we set ourselves the task of analyzing the selected 13 main indicators representing the stability of the system and evaluating their stability. The article mainly analyzes relative indicators. Because our goal in our research was to identify sustainable development trends.

### MATERIALS AND METHODS

Z.M. Ilyina suggests using the following approaches to analyze sustainability in agriculture [1]: static (determining the limits of market development); dynamic (study of the vibration of a series of speakers); adaptive (factorial assessment of the degree of adaptation of the food system to changes in external conditions).

In our article "Determining the quality of economic growth in agriculture and analyzing its indicators", we analyzed a number of economic indicators and found that the sustainable development of the food system is directly related to ensuring the quality of economic growth in our country. we found out. we found out. agriculture. we determined [2].



Organizational and economic mechanisms of sustainable economic growth in agriculture, according to their object and scope (food market, agricultural production, investment activity, state regulation, growth stability, implementation strategy, etc.) structural elements are proposed in the works of scientists. agricultural sector: E.F. Zavorotin [3, 300-p], V.Z. Mazloyev [4, p. 15], A.I. Oltukhova [5, p. 347] and others.

Ensuring sustainable development in the world includes consistent achievement of 17 international goals that define national development policy in the next 15 years. The role of agriculture and food security is paramount in eradicating poverty and hunger due to climate change and the need to conserve natural resources.

Sustainable agriculture involves using all the natural resources needed to produce food without harming the environment.

### ANALYSIS AND RESULTS

According to the FAO, the countries of Europe and Central Asia are generally considered to be sufficiently supplied with food. Although various forms of malnutrition problems are encountered in these regions - lack of micronutrients, anemia, about 25 percent of the adult population suffers from obesity, and about two percent suffer from malnutrition (for comparison, the world average is 9 percent). According to the research conducted in 2020 by the Ministry of Health of Uzbekistan in cooperation with the International Health Organization, 51% of the population of Uzbekistan suffers from overweight and 28% from obesity [6]. Also, according to the Statistics Committee, the percentage of undernourished people in Uzbekistan is 2.8 percent (0.9 million people) for 2016-2018 and 2.8 percent for 2017-2019. 6 percent (0.8 million people) [7].

The goals, tasks and main directions of agricultural development and regulation of the food

market in Uzbekistan are defined based on the strategy of agricultural development of the Republic of Uzbekistan for 2020-2030 [8]. The analysis of some statistical indicators of sustainable development of agriculture is presented in the table.

It is known that the growth of the production volume in a specific field in the form of monetary value can be realized due to the increase in prices. This may cause errors in determining the real growth rate of production in the industry. Therefore, in order to avoid such shortcomings, we calculated the index growth rate (1-5) indicators given in the table using the prices of the base year. That is, the prices are compared to the previous year, which reflects real gross growth. Also, to evaluate the stability of the network development indices, the fluctuation of time series on individual values and the geometric mean of the indexes calculated in the evaluation of the network sustainable development index were used.

As can be seen from the relevant data in the table, the index of agricultural production was clear in all categories, that is, an average increase of 120% was observed. In terms of stability, we observe stability in the index. Thus, there was no change in the index growth rate (0.2%) between 2016 and 2021.

Although growth rates were observed in the physical volume of investments of financial resources in the main capital in agriculture, the indicator had an average level. By 2020, compared to 2017, it has decreased sharply by -29%. Growth rates were observed only in 2016-2018.

In 2019, the index of economic added value in agriculture grew the fastest. Although the growth rate has decreased recently, the growth rate increased by 0.9% in 2021 compared to 2016, mainly living.

We can see high volatility in production agricultural products at all economic stages. In terms of the years

**Table**  
**Indicators of the development of agriculture**

N	Indicators	2016 y	2017 y	2018 y	2019 y	2020 y	2021 y	Variation coefficient *	Stability coefficient *	2016 y Compared to 2020, p.p.
1	Index of agricultural production in all categories (at comparative prices) in % compared to last year	118,1	113,9	114,1	129,7	124,5	118,3	5,2%	94,8%	0,2



2	Index of physical volume of investments in fixed capital in agriculture, % compared to last year	108,1	113,3	118,0	171,6	130,4		20,0%	80,0%	22,3
3	Index of added value created in agriculture, compared to last year, %	117,6	108,1	112,7	128,9	124,9	118,6	6,4%	93,5%	0,9
4	Growth of the index of agricultural products produced in all types of economic categories, in % compared to the previous year	113,4	119,9	106,6	127,8	119,1	119,3	6,1%	93,9%	6,0
5	Growth of the index of livestock products produced in all types of economic categories, in % compared to the previous year	124,0	107,1	123,7	131,8	130,3	117,2	7,5%	92,5%	-6,8
6	Export of fruit and vegetable products, in % compared to last year	46,5	116,4	135,5	138,1	83,5		37,4%	62,6%	37,0
7	Increase in real average monthly wages in agriculture, forestry and fisheries, in %		108,8	108,1	151,5	118,1		16,8%	83,2%	9,3
8	The indicator of return on capital is in % compared to the previous year	109,3	100,6	96,7	75,6	95,5		13,0%	87,0%	-13,8
9	The indicator of material return is in % compared to the previous year	99,3	91,5	98,1	99,0	100,5	100,4	3,4%	96,5%	1,1
1	Labor productivity in agriculture is % compared to last year	114,6	127,3	131,3	115,2	117,2	120,8	5,2%	94,8%	1,5
1	Total income per capita in rural areas		117,7	124,8	119,3	111,3	121,8	4,3%	95,7%	4,1
1	Global food security index [9], in % compared to last year	105,6	102,7	91,4	99,1	99,3	99,4	4,7%	95,3%	-5,1
1	Network sustainable development index	102,6	110,2	112,6	121,5	111,9	114,1	5,0%	95,0%	2,5



(geometric mean)									
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**Source:** Calculated by the author based on the data of the Statistics Committee.

*\*The given volatility and stability coefficients are calculated based on the actual time series indicators, not the indices presented in the table*

There were sharp ups and downs in the growth rate of the index. The main reason for this is, on the one hand, the influence of uncontrollable climatic conditions on the industry, and on the other hand, the lack of development of the value chain, logistics and sales systems in the industry. A high volume of production leads to a fall in the price of agricultural products, resulting in financial losses for agrarian organizations that do not have good financial support. This had a negative effect on production in the following year. Relative stability can be seen in the growth of livestock products index. The production of this sector is less sensitive to climate change. Thus, these two indicators have an inverse relationship and are trying to move to the path of stable growth.

The share of export of fruit and vegetable products is growing steadily. In 2017, it was 5.1% of the total export, and in 2020 it was 6.7%. Also, the indicator showed extreme instability in general. Our country has a high potential in the production of agricultural products. The increase in the export volume of agricultural and food products is set to reach 3.5 billion US dollars in 2021, 10 billion US dollars in 2025, and 20 billion US dollars in 2030 [10].

The real average monthly wage growth in agriculture, forestry and fisheries increased by a total of 9% in 2020 compared to 2017.

One of the main indicators of the efficiency of economic growth, indicating qualitative changes in the regional economy, is the indicator of material return in the production process. Material returns in the production process are determined at comparative prices using the following formula:

$$M_i^r = \frac{GO_i^r}{II_i^r} \quad (1),$$

Here:

Material return of  $M_i^r - i$  network in r-region, soum/ soum;

$GO_i^r - i$  - r- gross income of in r-region;

$II_i^r$  - r- in the production process, the material costs of the i-network, in the r-region (intermediate consumer goods)

In the last 6 years, the return of material in the agricultural sector of Uzbekistan has mainly decreased between 2015 and 2019. In 2015, the indicator of material return was equal to 2.85 p., in 2017 a sharp decrease (2.59 p.) was observed. After that, the indicator is growing steadily. It is worth

noting that the COVID-19 pandemic caused a decrease in other sectors, but it caused positive changes in agriculture. The material return in the agricultural sector of Uzbekistan decreased by 11 percentage points compared to the value of the indicator in 2015, or the material costs spent on the production of 1 soum of agricultural products in 2021 compared to 2015 increased by 12.4 percentage points.

The efficiency of using investment resources directed to the main capital of the region's economy is considered through the capital return indicator. Return on capital describes the amount of additional product produced per unit of investment.

The return on capital index is determined at comparative prices using the following formula as an indicator of material return:

$$K_i^r = \frac{GRP_i^r}{I_i^r} \quad (2),$$

Following:

$K_i^r - i$  - capital return of the network in r-region;

$GRP_i^r - i$  - gross income of the network in r - area;

$I_i^r$  - In the production process, the volume of investments in the i-network, in the r-region.

In the period of 2017-2020, the largest number of investments in Uzbekistan's agriculture was attracted in 2020 (14,776.8 billion soums). The amount of investments received in 2020 increased by 2.4 times (8,666.2 billion soums) compared to 2017. But it should be emphasized that the rate of return on capital has steadily decreased during these periods: by 2020, the rate of return on capital was 0.76 times compared to this rate achieved in 2015.

Another important indicator of the production process is labor productivity. Labor productivity describes labor. At the macro level, it is measured by the amount of output produced by a worker in a given period of time.

Labor productivity indicator using the formula:

$$L_p^r = \frac{GRP_i^r}{L_i^r} \quad (3),$$

Here:

$L_i^r - i$  - r-labor productivity of the network;

$GRP_i^r - i$  - gross income of the network in r - area;

$L_i^r - r$  - the number of people employed in the i-network in the region.



The analysis of changes in labor productivity in the agricultural sector of Uzbekistan shows that there was an increase in labor productivity in 2010-2021. The best progress on this indicator was achieved in the next 5 years, this indicator increased by 2.7 times compared to 2016, and by 8.7 times compared to 2010.

Food security is defined as a state in which people have physical, social, and economic access to sufficient and nutritious food to meet their dietary needs so that they can live healthy and active lives.

Using this definition, adapted from the 1996 World Food Summit, the Global Food Security Index examines the affordability, availability, quality and safety of food in 113 countries, along with natural resources and resilience, among other key issues. The index is a dynamic quantitative and qualitative indicator model composed of 59 unique indicators that measure food security factors in developing and developed countries. The overall objective of the study is to assess which countries are most and least affected by food security through the categories of affordability, availability, quality and safety, natural resources and resilience.

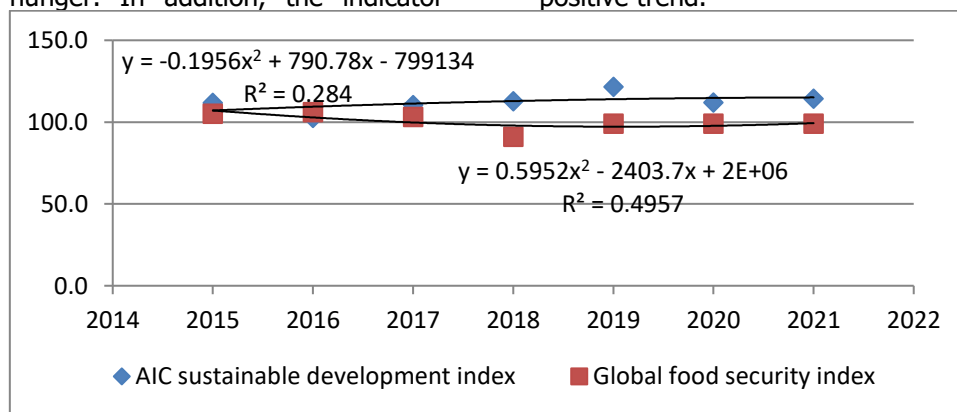
While food safety research is the focus of many organizations around the world, this indicator stands out for a number of reasons. This index is the first index to comprehensively examine food security across four internationally defined dimensions. In addition, the study considers key factors affecting food security beyond hunger. In addition, the indicator

identifies a number of unique quality indicators for food security drivers, many of which are related to government policy, and which are not currently measured in any international dataset.

After a sharp 12% drop in Uzbekistan between 2017 and 2018, the food security index is steadily decreasing. Thus, in 2017, this index was equal to 60.2, and by 2021, it decreased to 53.8.

When the index of sustainable development of the system was analyzed, it became clear that the sustainability of development in the network was higher than 110% in 2016-2021 (with the exception of 2016 - a low level). During the analyzed period, the analysis of the stability of the individual indicators of the development of agriculture showed a very strong instability in the indicator of the growth of the export of fruit and vegetable products. growth of real average monthly wages and return on capital in the fishing industry showed mainly instability, while all other indicators showed stability. Based on this, it should be noted once again that there are significant problems in the mechanism of investment and export organization in the country.

Also, in the figure below, when we compare the sustainable development index of the system developed by us with the Global Food Security Index, a similar indicator that is considered international, we mainly observe mutual compatibility. Although the level of reliability in our indicator is lower, it showed that the Global food security index is represented by a positive trend.



Source: compiled by the author.

**Figure. Comparative analysis of international and private indexes in evaluating the food supply system**

### CONCLUSIONS AND SUGGESTIONS

In conclusion, it can be said that most of the 11 indicators selected as indicators of sustainable development of the food system are unstable. Also, between 2017 and 2020, there were negative changes in 5 indicators, and an increase in the remaining 6. Strong fluctuations occurred in the observed indicators

during the period. In general, it can be said that in recent years there has been growth in agriculture in our country, but significant results have not been achieved. Nevertheless, it can be said that the food system has entered the phase of growth since 2017. This is evidenced by positive changes in the main indicators.





Researcher Yuliy Yusupov in his researches that agriculture in Uzbekistan is considered one of the most regulated sectors of the economy by the state. Also, emphasizing the extremely weak protection of the property rights of the main large agricultural producers - farmers, old management methods in the sector, underdeveloped markets for the sector and other shortcomings, he mentions the need to implement deep reforms in the agrarian sector. [11].

In our opinion, the following institutional measures should be taken to increase the stability of the food system:

- facilitating the use of agricultural innovations in order to promote socio-economic growth, ensure food security and nutrition, and reduce poverty; promote new business models, find new ways for developers to transfer innovation to the people who need it most, including small farms, land and other resource-constrained areas, to increase the efficiency, competitiveness and sustainability of agricultural production; use of open databases to overcome political, ideological differences and geographical borders, develop cooperation, exchange knowledge and information;

- transformation and reorientation of agricultural systems to climate-friendly agriculture to effectively support development and ensure food security in a changing climate;

- comprehensive development of rural areas aimed at increasing population incomes, ensuring the stability of the development process and reaching a compromise between agricultural development and rational use of natural resources;

- While increasing the profitability of organizations in agricultural production, it is necessary to preserve the biodiversity of rural ecosystems;

- reducing food loss and waste contributes to sustainable development, because the amount of food produced can be enough for the population of the planet, but every year about 820 million people suffer from hunger. It is necessary to strive for a fair distribution of food, a balance between those who eat too much or poorly and those who are undernourished. For this, it is necessary to implement the following: strengthening the state policy on self-sufficiency in food and its fair distribution to needy areas, subsidizing consumer prices in areas with food shortages, developing the transport logistics system. Applying existing knowledge and technologies in storage and transportation infrastructures, investing in new appropriate technologies to reduce post-harvest waste, implementing infrastructural, financial and market reforms to reduce waste;

- preservation and development of natural and cultural resources of rural areas, development of export and tourism, as well as use of geographical directions and place of origin of food products or handicrafts as an object of intellectual property. It is an element and guarantee of promotion of traditional and semi-processed products and contributes to the formation of a sustainable food system for healthy eating purposes;

- rational use of antimicrobials to limit the development of resistant "superbugs" and prevent the global trend of misuse of drugs that threatens health, food security and development; improving hygiene and improving the quality of medical services, for example, vaccination of people and animals, prevention of the spread of infectious diseases;

- reducing the negative impact of pests and diseases of agricultural crops on human health and the environment, their spatial distribution and interaction with plants. Annual losses from insects, weeds and diseases are about 20-40 percent. Improper use and storage of pesticides can have a negative impact on human health and the environment;

- development of organic agriculture. In 2019, the global organic market reached 90 billion euros. Despite the fact that Uzbekistan has a great potential in the export of organic agricultural products, the rate of export is growing slowly. Uzbekistan became the 9th country to sign GSP+ (General System of Preferences). This means that Uzbekistan can import all its goods to the European Union without customs fees. Unfortunately, for some reasons, these opportunities are not being used wisely. The main directions of development of organic production and export are as follows: organization of sales, formation of certification system, consumer awareness, use of agricultural technologies, education and training, state support of producers of organic products. - Support;

Thus, the sustainable development of the economy is supported by the system of stimulating economic activity, creating conditions for the use of attracted resources, and ensuring economic activity in accordance with the targeted tasks of economic development.

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