

Ensuring food security of the Republic of Uzbekistan in modern conditions

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Abstract. The article presents the theoretical aspects of the concept of food security, and, in particular, its elemental composition. The current state of the agricultural sector as the basis of the food independence of any state is analyzed. An assessment was made of trends in food security of the Republic of Uzbekistan based on the criteria of physical and economic accessibility, as well as factors that have an indirect impact on the level of food security in the country. The results of the ranking of the Republic of Uzbekistan in the global food security index are analyzed. Based on the analysis of the regulatory framework and documents of the strategic development of the Republic of Uzbekistan, assessment of its food independence, identification of strengths and weaknesses of the country's existing food security system, a methodological architecture of food security of the Republic of Uzbekistan was proposed, reflecting the development priorities of the Republic of Uzbekistan in the field of food security as one of key components of economic and national security.

1 Introduction

Food security of the country is one of the most important components of any state. General approaches to ensuring the food security of a particular state, as a rule, are reflected in strategic documents such as a concept, doctrine, strategy. Directions for ensuring food security are directly related to the geographical location, natural and climatic conditions of the country, the level of economic development, the political situation, and the possibilities of international cooperation.

The problems of ensuring food security have become especially relevant during the start of the spread of a new coronavirus infection. In most countries, there was a rush demand for essential goods, as well as imported goods, due to restrictions being introduced to prevent the spread of COVID-19, which inevitably led to an artificially created shortage of certain categories of goods (cereals, sugar, hygiene products) and price increases.

Overpopulation, urbanization and climate change still remain among the global problems in the field of food security [1]. Researchers [2] note that food security is not limited to the population and their environment, but also depends on such a source of food as animals.

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For many years, the economic model of the Republic of Uzbekistan was the export of cotton fiber (about 60%). Thanks to the ongoing economic policy, there has been a significant change in the structure of exports, but agriculture is still a key sector of the economy that affects the socio-economic stability of the country.

An analysis of the legal framework showed that in Uzbekistan there is no regulatory document regulating the directions of ensuring the country's food security. In part, food security issues are addressed in the Strategy for the Development of Agriculture of the Republic of Uzbekistan for 2020-2030 [3] as one of the directions for its implementation. However, the scope of food security is much broader, and in addition to the development of agriculture, it should take into account economic, social, institutional and other factors [4].

Thus, a detailed study of issues of food independence, building an effective system for ensuring food security, taking into account the above factors, is relevant for the Republic of Uzbekistan.

Most research on food security begins with the 1996 World Food Summit definition of food security: "Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to satisfy their nutritional needs and preferences for an active and healthy lifestyle" [5].

The main elements of the definition of "food security" are food independence and the availability of food products (physical and economic). In general terms, food independence is understood as the ability of a country to produce a sufficient amount of food of adequate quality [6, 7].

The researchers note that, in general, the world is characterized by food sufficiency, but it is not properly distributed among countries, due to the difference in income between different population groups. Moreover, not all foodstuffs are culturally appropriate for a given country [8].

2 Materials and Methods

To achieve the goals of the study, a complex of theoretical and empirical methods was used. In particular, the study of the current state of food security in Uzbekistan was carried out using analysis, deduction, graphical and statistical methods. Selected food security indicators were determined using an indicator approach. The institutional environment for ensuring food security of the Republic of Uzbekistan was studied based on an analysis of the regulatory framework and documents of the country's strategic development. When developing the methodological architecture of food security, formal logical research methods were used.

A systematic approach and synthesis make it possible to summarize the main components of the country's food security and present them in the following form (Figure 1):

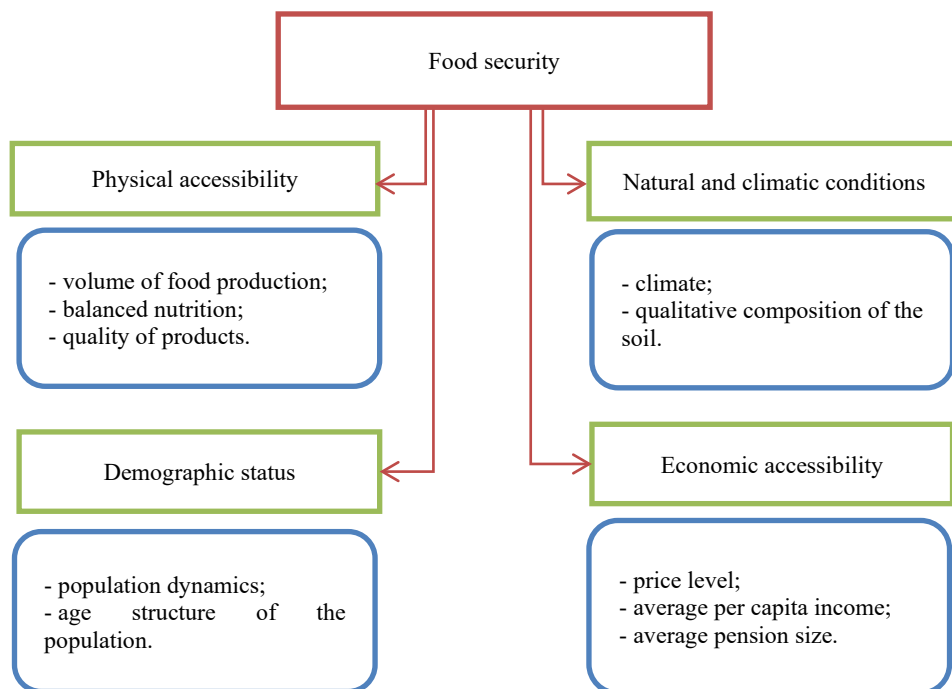


Fig. 1. Key elements of food security

These elements of food security served as a methodological basis for studying the current state of food security.

In addition to the above indicators, the basis for determining the physical availability of food is the food import coverage ratio (K), defined as the ratio of food exports to food imports. Based on the food import coverage ratio, the level of physical availability of food is calculated using the following criteria:

- $K \geq 1$ – high level of physical availability of food;
- $0,75 \leq K \leq 0,99$ – acceptable level of physical availability of food;
- $0,3 \leq K < 0,99$ – low level of physical availability of food;
- $K < 0,3$ – unacceptable level of physical availability of food.

3 Results

3.1 The current state of food security in the Republic of Uzbekistan

At the end of 2021, the Republic of Uzbekistan took 73rd place in the Global Food Security Index (GFSI). This index contains 58 indicators that characterize the availability of food products, natural and climatic conditions, the state of natural resources, and economic inequality [9]. A positive trend is the growth of Uzbekistan's position in the overall ranking by 12 points compared to the 2019 ranking, as well as significant progress in terms of such criteria as economic accessibility (52.7 points), quality and safety (64.6 points), agricultural trade (73.8 points), disaster risk management (100 points). The criterion of physical accessibility has a negative trend, in particular supply chain infrastructure, political and social barriers.

For the period from 2011 to 2021, there is a steady upward trend in the volume of agricultural, forestry and fisheries production (Table 1).

Table 1. Main indicators of agriculture [10]

Index	2011 r	2013 r	2015 r	2017 r	2019 r	2021 r
The volume of products (services) of agriculture, forestry and fisheries, billion soums	48,068.3	69,391.3	103 302	154,369.4	224 265.9	317,027.6
Volume of fish catch, tons	17,234.9	37 505	59,851.5	83 900.4	121 717	171 933.1
Sown area of agricultural crops, thousand hectares	3601.6	3658.6	3694.2	3474.5	3309.4	3260.7

The volume of production of agriculture, forestry and fisheries, taking into account the price index, has increased by 61% over the past 10 years. In 2011, Samarkand (14.8%), Tashkent (11.5%) and Kashkadarya (9.2%) regions made the largest contribution to the production of agricultural, forestry and fishery products. On average, 8% of products were produced in Bukhara, Surkhandarya and Fergana regions. By 2021, leadership has passed to the Samarkand region (12.7%), Andijan (10%) and Tashkent (9.9%).

Positive dynamics is observed in terms of the volume of fish catch, taking into account the natural and climatic conditions and the geographical location of the country. Between 2011 and 2021 fish catch increased by more than 9 times, which indicates an improvement in the composition of the food basket and a balanced diet.

In terms of the sown area of agricultural crops, the opposite trend is observed - in absolute terms, the sown area decreased by 340.9 thousand hectares by 2021, which is 9.5% lower than in 2011.

In physical terms, food production also increased (Table 2). In 2022, the volume of meat production amounted to 2,726 thousand tons, which is 12.8% more than in 2018. The production volumes of cereals, melons and potatoes increased by 25-27%. The volume of fish caught has almost doubled over the past 5 years.

Table 2. Volumes of food production, thousand tons [10-14]

Type of food	2018	2019	2020	2021	2022	Growth rate, %
Meat	2417.4	2465	2526.2	2640.4	2726	112.8
Fish	91	121.7	144.1	173.9	177.4	194.9
Milk	10480.7	10,710.8	11,009.9	11,286.9	11,629.4	111.0
Vegetables	9635.1	9945.5	10459.5	10,859.3	11 163	115.9
Cereals	6375.4	7,187.4	7566.6	7540.9	7994.9	125.4
melons	1904.9	1922.2	2134.4	2281.1	2420.7	127.1
Fruit	2589.7	2,739.6	2864	2,852.5	2983.5	115.2
Potato	2750.1	2950.9	3,143.5	3292.3	3441.7	125.1
Eggs, mln.	7360.5	7,757.4	7 825	8,053.1	8,129.3	110.4

According to the calculations of the Eurasian Development Bank, Uzbekistan has a sufficient level of self-sufficiency in most food products, with the exception of sugar [15].

It is advisable to compare the growth rates of indicators of physical food availability with the current demographic situation. According to Figure 1, the demographic state of the country is also an element of food security, characterized by two indicators, the dynamics of which are presented in Table 3.

Table 3. Indicators of the demographic state of the country [10]

Index	2018	2019	2020	2021	2022	Growth rate, %
Population, thousand people	32657	33256	33905	34559	35271	108
including, proportion of the population aged (%):						

up to 4 years	10.6	10.7	10.8	10.9	11.1	104.7
5-9 years old	9.7	9.6	9.6	9.7	9.7	100
10-19	16.2	16.2	16.3	16.3	16.4	101.2
20-34	28.1	27.6	27	26.2	25.3	90
35-54	23.5	23.6	23.8	24	24.3	103.4
over 54	11.9	12.3	12.6	12.9	13.1	110.1

The population of the Republic of Uzbekistan is growing annually and in 2022 amounted to 35,271 thousand people, which is 8% higher than in 2018. The age structure of the country, in general, is optimal and has a stationary type. The proportion of children aged 5-9 years has not changed, while those under the age of 4 have increased by 4.7%. There is also a slight increase in children and young people under the age of 19 (+1.2%) and the mature population aged 35-54 (+3.4%). The negative trend is a decrease in youth by 10% and an increase in the elderly population by 10.1%. Thus, we can conclude that, despite some negative aspects of the demographic situation, the level of physical availability of food for the population is increasing.

An important component of the assessment of the country's food security is the analysis of foreign trade turnover of food products and agricultural raw materials. An analysis of the export structure of the Republic of Uzbekistan over the past 20 years (Figure 2) showed that the share of exports of food products and live animals increased from 3.2% in 2000 to 8.2% by 2010. Moreover, in 2021 this indicator is equal to the level of 2010. Therefore, we can conclude that the country is able to ensure the physical availability of food for the population.

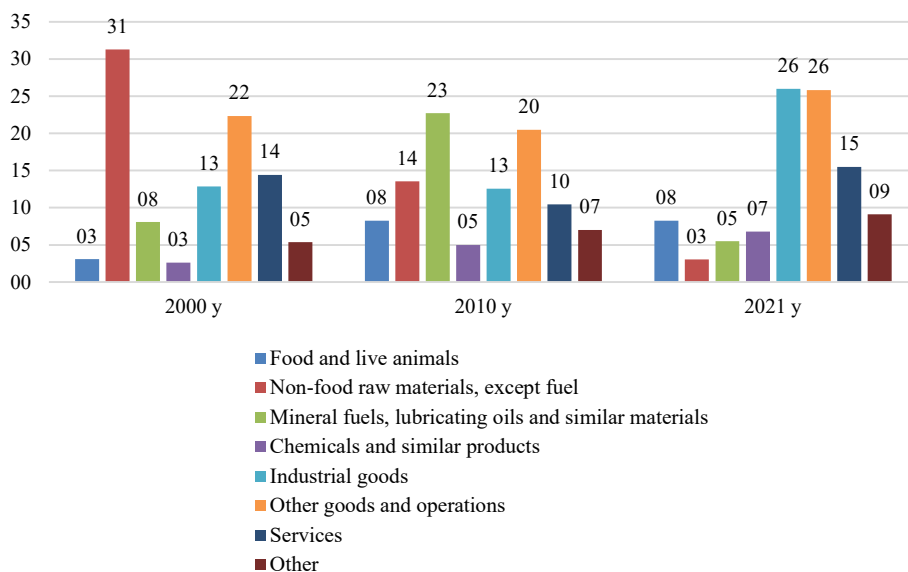


Fig. 2. The structure of exports of the Republic of Uzbekistan by categories, % [10]

Export of fruits and vegetables in 2022 amounted to 1,743.7 thousand tons, which is 1,145.8 million US dollars. The main exported types of fruits and vegetables are grapes (318.9 thousand tons), onions (216.7 thousand tons), melons and watermelons (136.6 thousand tons), mung bean (122.4 thousand tons), cabbage (150 thousand tons), persimmon (85.4 thousand tons), peach (76.7 thousand tons), tomato (76.4 thousand tons).

At the same time, in the period from 2011 to 2021, there has been a significant increase in food imports by more than 3 times (Figure 3).

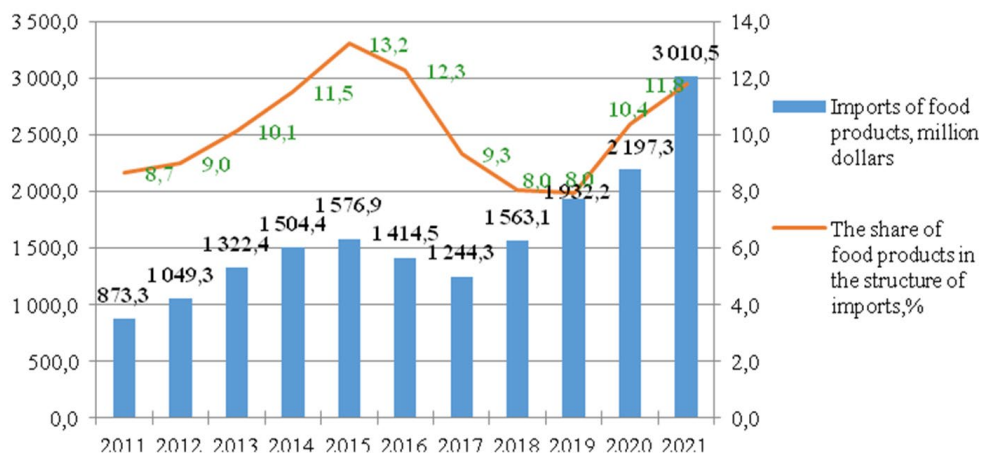


Fig. 3. Dynamics of food imports to the Republic of Uzbekistan

On average, for the period 2011-2021, the share of food products in the structure of the country's imports amounted to 10%. At the end of 2021, the following data on the volume of food imports to the Republic of Uzbekistan were received - flour and flour products (\$158 million), sugar and confectionery (\$146 million), fruits and vegetables (\$142 million), dairy products, eggs and honey (\$68 million), soft drinks (\$48 million), canned food (\$43 million), cereals (\$14 million) [16].

The main criterion for assessing the physical availability of food is the food import coverage ratio, defined as the ratio of food exports to imports. Over the period from 2018 to 2022, the food import coverage ratio decreased by more than 1.5 times (Table 4).

Table 4. Physical accessibility of food in the Republic of Uzbekistan

Index	2018	2019	2020	2021	2022	Growth rate, %
Food import coverage ratio	0.8	0.77	0.63	0.47	0.45	56.2
Level of physical accessibility	admissible		short			-

(Source: compiled by the authors based on [17])

Table 4 shows that the dynamics of the food import coverage ratio affected the level of physical availability of food: in 2018-2019, the physical availability of food was at an acceptable level; since 2020, the level of physical accessibility is characterized as low.

The economic accessibility of food is understood as the possibility of acquiring food products at established prices in the required volumes and assortment, while ensuring the proper level of income of the population [6]. Therefore, when analyzing the availability of food products, it is first of all important to assess the financial capabilities of the population [18] to purchase the necessary products (Table 5).

Table 5. Dynamics of household income for the period 2011-2021 [10]

Index	2011	2013	2015	2017	2019	2021
Total income of the population, billion soums	85,933.5	126 268	169 344.3	236,893.1	365 735.6	519 181.4
Total income per capita, thousand soums	2928.9	4,175.1	5410.6	7314.1	10,891.3	14,869.8

Real total income of the population, billion soums	80,094.6	118,029.5	160,485.5	216 400.1	319 336.1	468 448.4
Real total income per capita, thousand soums	2,729.9	3267.8	5,127.5	6,681.4	9,509.6	13,416.8

For the period 2011-2021 there is a positive trend in both nominal and real aggregate incomes of the population. The total income of the population increased 6 times, per capita 5 times. Real total per capita income in 2021 amounted to 13,416.8 thousand soums, which is 1,453 thousand soums less than the value of nominal income; at the same time, these indicators have a similar dynamics - the growth of income per capita increased by 5 times. Therefore, analyzing the absolute indicators of Table 5, we can conclude that the standard of living of the population has increased.

To determine the economic affordability of food, the relative indicators presented in Table 6 are calculated.

Table 6. Economic accessibility of food in the Republic of Uzbekistan [10]

Index	2017	2018	2019	2020	2021	Growth rate, %
Share of low-income population, %	11.9	11.4	11.0	11.5	17*	142.9
Uneven distribution of the population by income level, %	6.2	6.1	6.0	6.9	6.8	109.7

* - from 2021 poverty rate indicator

Note: until 2020, the share of the poor was calculated at the rate of 2,100 kilocalories per day on the recommendation of the World Bank; from 2021, the indicator is calculated by comparing the income of the population with the amount of the MNR in accordance with the Decree of the Cabinet of Ministers No. 544 of August 27, 2021.

According to Table 6, in all analyzed periods, the poverty rate ranged from 0.11 to 0.2, which corresponds to a low level. Until 2019, there was a gradual decrease in the share of the low-income population, but in 2020 the value of the indicator again reached the level of 2018. A significant increase in the poverty rate in 2021 is associated with a change in approaches to its calculation.

The indicator of uneven distribution of the population by income level tends to increase. In 2021, this figure was 6.8%, which is 9.7% higher than in 2017. Despite this dynamics, in all analyzed periods, the level of the indicator belongs to the category of acceptable values. This indicator has an exceptionally strong influence on the structure of consumption [19].

3.2 Methodological architecture of food security in the Republic of Uzbekistan

An analysis of the regulatory framework and strategic development documents of the Republic of Uzbekistan allows us to conclude that there is no sustainable system for ensuring food security, as well as legislative acts to regulate it. However, in the Strategy for the Development of Agriculture of the Republic of Uzbekistan for 2020-2030, one of the priority areas contributing to the achievement of the goal of the Strategy is to ensure the food security of the population.

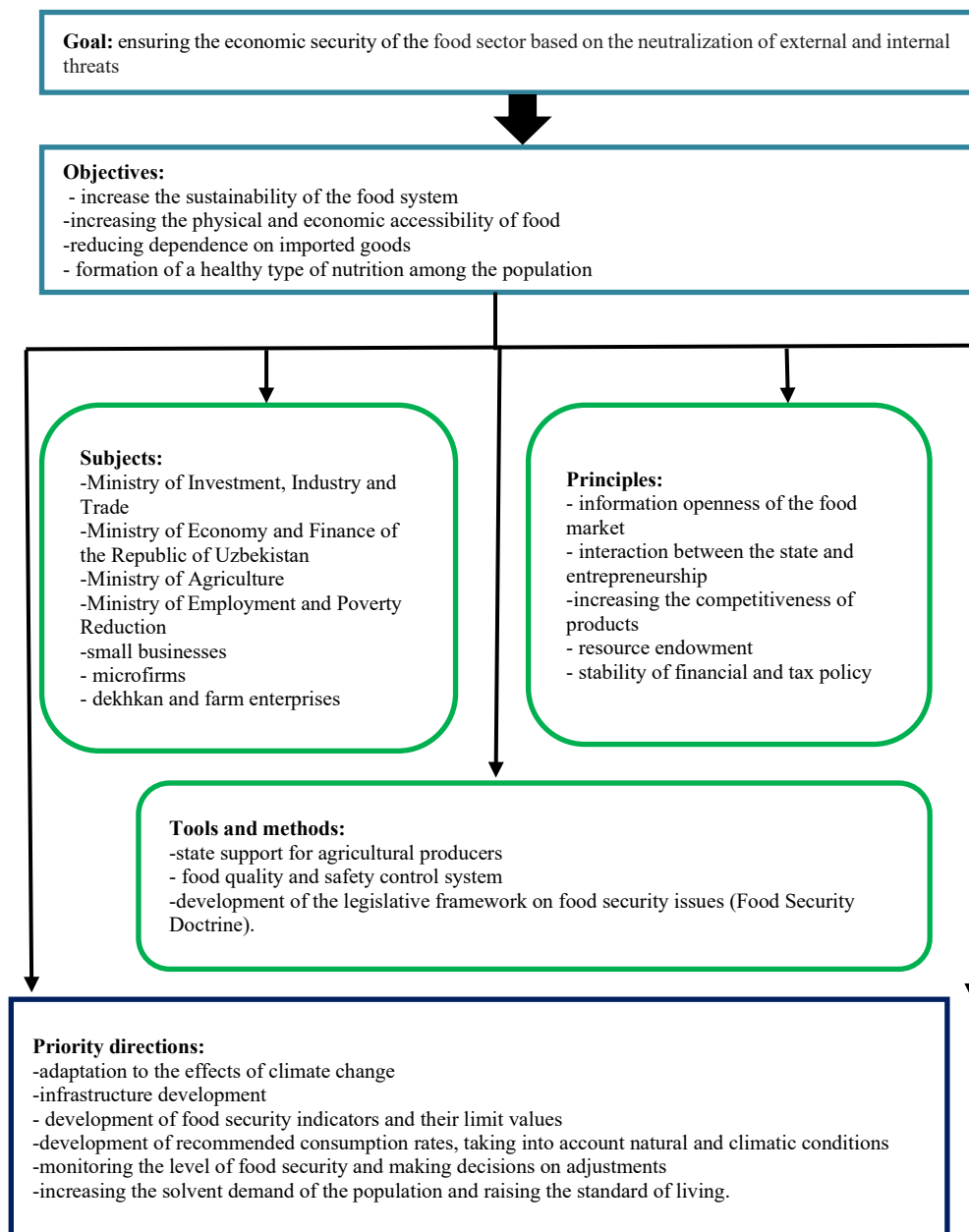


Fig. 4. Methodological architecture of food security in the Republic of Uzbekistan. (Source: compiled by the authors based on [20])

As noted above, food security is multifaceted. Taking into account the development trends of the agricultural industry and the state of the country's food security system as a whole, a methodological architecture of food security of the Republic of Uzbekistan was proposed (Figure 4), reflecting the development priorities of the Republic of Uzbekistan in the field of food security as one of the key components of economic and national security.

The purpose of the methodological architecture is to prevent external and internal threats to food security - rising food prices, reducing real incomes of citizens, reducing the competitiveness of the agricultural sector, geopolitical changes and others. The subjects of

ensuring food security will be not only government bodies (Ministries), but also business entities and households. To achieve a sufficient level of food security, the key directions of state policy should be the development of guidelines for collecting, recording and assessing food security indicators, a set of measures for infrastructure development, taking into account food consumption standards and opportunities for their acquisition.

4 Discussion

Food security in the modern world is still an urgent problem for most countries [1, 2, 5, 7]. The Republic of Uzbekistan is one of the countries with the greatest progress in the field of economic policy, however, food security issues are considered at the state level in fragments [11-14, 15].

To ensure the food security of any country in modern conditions and to prevent external and internal threats in this area, it is necessary to take into account many factors that have a significant impact, among which the following can be distinguished: informational safety of objects [21] and devices [22], strengthening of food safety measures [23], development of retail markets [24], continuous assessment of the economic security of the region [25] and increasing its effectiveness [26], improvement of the system of organizational and economic mechanism of innovative development of the region [27] and economic sectors [28-30], introduction of intelligent technologies [31], strengthening online processes [32], changes in regional integration [33] and consideration of criteria for sustainable development of regions [34].

Among the gaps in this area were the lack of elaboration of the regulatory framework, the lack of established norms for food consumption, and, as a result, statistical data on the indicator of the sufficiency of food consumption by the population, the absence of a system of indicators and threshold values for assessing the level of food security. To solve the identified problematic issues, a methodological architecture of food security of the Republic of Uzbekistan was proposed, the main goal of which will be to achieve economic security of the food sector based on the neutralization of external and internal threats.

The list of tasks, tools and priority areas of the methodological architecture is not closed and, if necessary, can be supplemented. This methodological architecture makes it possible to form a trajectory for future research and development in the field of food security in the Republic of Uzbekistan.

5 Conclusions

The current state of food security of the Republic of Uzbekistan is characterized as satisfactory. The article noted that food security is a multifaceted concept and includes not only the food supply of the population, but also other socio-economic factors. As a result of the analysis of individual components, an increase in the volume of agricultural production and fishing, and the volume of exports of fruits and vegetables was revealed. An increase in imports by more than 2 times over the past 10 years has negatively affected the food import coverage ratio, which led to a low level of physical availability of food at the end of 2020-2022. Particular attention should be paid to the economic accessibility of food - a set of measures is needed to improve living standards and reduce the share of low-income people.

It was found that the institutional environment for ensuring food security of the Republic of Uzbekistan is at the nascent stage. From a methodological point of view, it should be noted that there is a lack of statistical data for calculating food security indicators, which does not allow determining its level. In order to ensure the development of this type of economic security of the state, a methodological architecture for food security of the Republic of

Uzbekistan was proposed, which reflects the principles that must be followed in the development of strategic documents in the field of food security, the entities that will be involved in the implementation of strategic objectives, as well as tools and methods, which are a priority in achieving the set goals within the priority areas.

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