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Article





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INTERNATIONAL METHODOLOGICAL ASPECTS CHARACTERIZING FOOD SAFETY AND THE SYSTEM OF INDICATORS EVALUATING IT

Abstract: Socio-economic and political processes and realities emerging and threatening it on a global scale are considered the main factor threatening food security in countries. On the one hand, this is due to the occurrence of global economic, financial, and agrarian crises, the reduction of international food markets and the increase of prices in them, and on the other hand, the trend of decreasing agricultural arable land is maintained in the context of the growth of the world population and the intensification of urbanization processes. Opinions on these issues are expressed in the scientific article and interpreted from a scientific and theoretical point of view.

Key words: food security, social security, consumer basket, agriculture, consumer products, food indicators. Language: English

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Introduction

As a result of global climate changes, globalization of the economy, in order to obtain high profits in the world market, the production of dangerous products, plant pests and various dangerous diseases as a result of the large-scale use of various antibiotics, hormones and similar components and additives harmful to human health in the production processes of food products. The spread of viruses is exacerbating the above problems. In particular, since 2020, the issue of growing and delivering basic types of agricultural and food products for population consumption is considered the most urgent task in the world, in the conditions of increased epidemiological risks, i.e. due to the COVID-19 pandemic.

In September 2015, the agenda of the meeting with the participation of the UN member states adopted the global Millennium Development Program and Sustainable Development Goals until 2030. One of the objectives set in this program is the commitment to "eliminate hunger, ensure food security, and promote healthy nutrition and sustainable agriculture"[1].

Various approaches to the interpretation and determination of food safety and its components have

expanded in the beginning of the last century and in the years of the Second World War due to the aggravation of the problem of providing food products to the population on a global scale. In order to solve this problem, efforts have been made to create an international organization dealing with food and agricultural issues within the UN.

Various approaches to the interpretation and determination of food safety and its components have expanded in the beginning of the last century and in the years of the Second World War due to the aggravation of the problem of providing food products to the population on a global scale. In order to solve this problem, efforts have been made to create an international organization dealing with food and agricultural issues within the UN. Until this period. the term food security of the state was not used. However, increasing the production of food products at the expense of the countries' own funds, and the issues of self-sufficiency of the population with food products through the development of agriculture have increased. In the period from May 18 to June 3, 1943, a conference on the creation of an international organization on food and agricultural issues was organized in the city of Hot Springs, USA, with the



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participation of representatives of 46 countries of the world. At the conference, recommendations were made to the states on the development of national agriculture and the reduction of customs duties on agricultural food products. It was also suggested that the new organization be called the Food and Agriculture Organization of the United Nations (FAO).

It should be noted that the main international body that determines the strategy in the field of food safety is the Food and Agriculture Organization of the United Nations. The committee was established in 1974 as an intergovernmental body to review and adopt policy measures on food security. The committee organizes international summits and forums on food security issues. They define near-term tasks and measures to ensure food safety. Assessment of food security and determination of measures in the areas defined by the UNFCCC are carried out by FAO. UNICEF and the World Health Organization and other international organizations and associations are involved in these works[2].

The term food security entered international circulation after the grain crisis of 1972-1973. During this period, in the case of excess food production in the developed countries, famine occurred among the population in the third world countries. This problem has begun to be discussed in the world community. In the context of these discussions, the UN General Assembly held in December 1974 approved the "International Commitments to Ensure World Food Security" developed by FAO. However, the term "food safety" is not defined in this document.

It is important to clearly define the criteria and indicators of food safety in the implementation of the state policy aimed at ensuring the country's food safety. Assessment of food security, first of all, requires the creation of a system of target indicators for the interested party, and encourages taking measures based on socio-economic development programs at various levels to achieve them. The methods and indicators used to assess food safety at different levels have a direct impact on the effectiveness of measures aimed at achieving this goal. After all, what cannot be measured cannot be effectively regulated.

According to M.R. Bulatasov, indicators of ensuring food safety are as follows:

1) level of production of agricultural products, raw materials and food per capita;

2) level of consumption of basic types of food products per capita;

3) energy content of the population's diet;

4) consumption of food products by individual population groups;

5) the share of the import of basic food products in the volume of commodity resources;

6) the (comparative) volume of strategic and current food reserves in relation to standard requirements;

7) the main mechanisms and risks of ensuring food safety[3].

E.S. Baytilenova and A. Daurbaeva highlight the following main criteria of food safety assessment methods in the case of the Republic of Kazakhstan:

- production of 75-80 percent of the total volume of food products by local producers in the country;

- consumption of food products at a reasonable level of calories by the population (3000 kcal per day);

- to ensure a reasonable composition of food and fully meet the needs of the population in physiologically based standards (norms);

- creation of food insurance reserves at the level of 17 percent of the annual volume of food consumption;

- the existence of real opportunities to meet the need for food products that are not produced in the country or are produced in small quantities at the expense of imports;

- grain production in the amount of not less than 1 ton per capita[4].

E. Balatsky, N. S. Ogluzdin and S. V. Paramonova established the following indicators representing the criteria of food safety:

- the share of food costs in the total costs of individual groups of the population;

- regional supply of products. This indicator is measured by comparing the retail price levels of the same goods in different regions of the country;

- the level of "convenience" of food (the share of consumption of modern products that reduce and save time spent on household chores);

- the "naturalness" (purity) and quality of products, the impact of products, including those obtained using genetic engineering, biotechnology methods, on human health[5].

It is easy for everyone to calculate these indicators on the basis of the information provided by statistical authorities on their websites, and they can have a general idea of the level of food supply in the area where they live and their family. But it does not allow a full assessment of the country's food security.

According to L.I.Abalkin, economic security is a condition of the economic system that enables it to develop dynamically and effectively and to solve social tasks[6].

Uzbek scientist H.P.Abulqosimov, recognizing the definition given by L.I.Abalkin, interprets the concept of economic security as the country's economic independence and stability of the national economy, as well as its ability to develop and progress on its own despite internal and external threats[7]. In his opinion, in order to understand the essence of the concept of "Economic Security", first of all, it is necessary to determine the interdependence of the concepts of "development", "stability" and "security".



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The structural elements of economic security, that is, the classification of the forms of manifestation, was developed by H.P. Abulkosimov in a more complete way. He classified the forms of economic security from the point of view of the subjects of the economy, from the point of view of individual, enterprise and state economic security, and from the point of view of economic spheres, productioneconomy, economy-consumption, financial, transport-communication, social spheres[7]. Food safety is included in the group of forms of safety that arise in the economy-consumption sector.

The systems of criteria and indicators for evaluating food safety at the international, national and regional levels proposed by A.N.Anishenko, V.Uskova, R.Yu.Selimenkov, A.N.Chekovinsky deserve attention. According to them, food security at the international level is evaluated on the basis of two criteria: the volume of world grain reserves going into the next harvest period and the level of world grain production per capita.

S.S. Bekenov, a scientist from Uzbekistan, proposed to include the coefficient of food dependence in the criteria for evaluating food safety. To calculate this coefficient, according to him, the following formula is used:

$\mathbf{K} = \mathbf{I} / \mathbf{P}$

Here: I is the import volume of this product, P is the amount of demand for this product in the country.

According to S.S. Bekenov, the following three levels of food addiction can be distinguished:

- if the food dependence coefficient is between 0.1 and 0.2, then the level of food dependence is at a safe level;

- if the food addiction coefficient is around 0.25-0.3, it is proposed to call this situation the dangerous limit of food addiction; - if the coefficient of dependence on food is higher than 0.5, then the level of dependence is dangerous[8].

According to the author, this indicator is extremely relevant for the countries of the transition economy, because as a result of the expansion of imports in the conditions of the liberalization of foreign trade, many domestic producers were squeezed out in the domestic market in Russia, Kyrgyzstan and other countries. About 40% of food products in Russia, 35% in Kazakhstan, and 45% in Ukraine are imported products. They have crossed the dangerous threshold of food dependence on the foreign market.

Also, Fatima Nazarova offers 30 different indicator systems for assessing food supply. In this, of course[9], their importance, harmonious unity and taking into account the unique features of our country are noteworthy.

The scientist studies this indicator system, dividing it into 2 groups. Group 1 includes synthetic, i.e., embodied indicators that are widely used in world practice, and group 2 includes indicators that directly affect the supply of food products to the population.

Among the elements of economic security, food security has a special place. The main goal of the economy is to satisfy the needs of man and his socioeconomic needs, including the need for food. Satisfying the need for food is the primary goal. Of course, the purpose of life for a person is not only to eat food and satisfy the need for it. It has many other socio-economic, political, cultural, spiritual, etc. needs exist. But in order to achieve his other high goals, to satisfy his many needs, first of all, man needs to satisfy his need for food. That's why ensuring food security plays an important role in human economic activity.



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It should be noted that in some regions of the world, as a result of mutual and civil wars, terrorist activities, and political tension, the volume of food production has sharply decreased, the number of refugees and migrants has increased, and as a result of their unofficial entry into the territory of the country, prices in the international and domestic food markets have increased. the excess of the navos causes the emergence of problematic situations that make it difficult to ensure food safety. Also, the deterioration of the political, socio-economic situation in the traditional partner countries, the interruption or weakening of food production, export and import relations with them is also a serious external threat to ensure food security.

The main criteria of food safety at the national level are as follows:

- the level of self-sufficiency of the country with food and the fact that the independent supply of food products does not depend on supply on the basis of imports;

- comparative amounts of strategic and current food reserves in relation to the normative standards of consumption;

- level of food production per capita;

- level of consumption of extremely important products;

- level of physical and economic access to food for different classes of the population;

- stability of the prices of basic food products;

- quality and ecological purity of food products.

The food security of the country's regions is evaluated by the following criteria and indicators:

1. Physical access to food. It is defined by the provision of space for 1,000 people to carry out food trade and the presence of a network of roads in the area. At the same time, another indicator that determines the availability of food is its price. Based on it, the following are analyzed:

- average purchase prices of food products consumed in households (rubles/1kg);

- the value of food products in households of different composition (in relation to each member of the household / ruble);

- expenditure on food as part of consumption expenditure of the population (on average per household member per month);

- production of basic types of agricultural products per capita (kg, units).

2. Economic access to food is expressed through poverty and purchasing power coefficients of population income.

3. The quality and safety of food products produced and consumed in the region is determined by the percentage of discarded goods (quality coefficient).

4. Amount of seasonal reserves of food products, primarily grain, from one harvest to the next.

5. The dependence of the region (district) on food imports is determined by the ratio of production and consumption of the main types of food products.

6. The level of satisfaction of the population's needs for basic food products. This indicator is determined by the nutrition coefficient.

7. The level of energy resources in the diet of the population in the researched area. This indicator is determined by comparing the caloric content of food with medical standards[10].

If the following conditions are met, the food security of the country will be fully ensured:

- if the population of the country is provided with ecologically clean, healthy food products produced in the homeland according to scientifically based standards, taking into account gender, age, working conditions, natural and climatic conditions;

- if the prices of these food products are at an acceptable level for all citizens, large families, pensioners, regardless of their nationality and profession;

- creating strategic reserves of food in case of natural disasters, wars or other emergency situations. These reserves provide an opportunity to prevent famine in the country for at least five years, based on the introduction of a balanced distribution of food products. In the USA and Switzerland, a grain reserve sufficient for this period has been created;

- ASM, fisheries and forestry will develop sustainably and will have reserves that will allow to accelerate the production of food products, help other countries affected by natural disasters or war;

- science will be at the level of the world's highest achievements and will provide all spheres of life with the latest techniques and technology, and will improve the gene pool of animal husbandry and plant science, and provide reliable forecasts for the development of society in the future;

- conservation and restoration policies and practices ensure the preservation and improvement of the environment.

Food safety is partially ensured if the following conditions are met:

- at least 85 percent of the country's population will be provided with domestically produced food products, and these products will be ecologically clean and beneficial for human health. This standard will be close to the standards adopted by FAO;

- the prices of these products will be at an acceptable level for the main part of the working population of the country;

Food safety is partially ensured if the following conditions are met:

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A country's food security is not achieved if:

- 60-80% of the country's population is provided with ecologically pure and healthy food products produced in the country;

- the prices of these products will not be at an acceptable level for the majority of the working population;

- the strategic stock of food is reduced or does not exist;

- the production capacity does not allow to accelerate the production of food products[11].

In the "National Program for Ensuring Food Security in the Country in 2019-2024" approved by the decision of the Cabinet of Ministers of the Republic of Uzbekistan "On Approval of the National Program for Ensuring Food Security in the Country in 2019-2024", which was discussed on March 7-25, 2019, Indicators of the state of ensuring food safety are determined according to the following directions:

a) quantitative indicators:

minimum consumption basket;

capacity level of average daily population rations by regions;

average monthly salary;

total income per capita of the population;

life expectancy;

level of education;

per capita consumption of staple foods.

b) quality indicators:

level of housing provision;

employment and unemployment;

financial security;

openness of education;

free access to health care services;

- peace and security in society;
- healthy ecological situation[12].

These indicators are evaluated according to the following important directions, based on the levels of welfare of different social strata of the population, consumption abilities:

the quality of food consumption of the population - the energy value of the ration consumed by 1 person per day should not be less than 80% of the accepted consumption basket, the consumption of products for 1 person in 1 year (90-100% of the medical norm), animal protein should not be less than 50% of the total protein);

the level of health of the population - natural growth, life expectancy, the impact of poor nutrition on the spread of diseases;

quality of education - ratio of literate population, etc.;

the ability to consume food products - the growth rate of agricultural products (not less than 5-7% per year), the share of profitable enterprises (not less than 60%), the stagnation rate of grain production (not less than 75%), the ratio of debtor and creditor debt of organizations (not less than 40%), the total ratio of investments in agriculture (not less than 10%);

the possibility of economic consumption of food products in the cross-section of social groups, in the cross-section of urban and rural areas - the share of food costs in the total costs (not more than 35%), the increase in the consumption of food products taking into account the real income of the population (not less than 1%) the total share of low-income population is not more than 8% in urban areas and 10% in rural areas), the level of income inequality (not more than 45%), the share of unemployment (not more than 4%), the share of domestic consumption of the population in imports (not more than 20%) without it) and others[12].

In the assessment of food safety, the total share of the following products produced in Uzbekistan compared to imported products is used as an indicator:

grain - not less than 95%;

sugar - 80%;

vegetable oils - 80%;

meat products (calculated as meat) -85%;

milk and milk products (calculated as milk) - 90%;

fish products - 80%;

potatoes - 95%;

table salt - 85%[12].

The above-mentioned prompts us to turn not only to the theoretical aspects of food safety identification and assessment, but also to the world experience of its assessment. After all, the number of theoretical works on the subject is increasing year by year, but not all of them have found their practical expression and are not recognized at the international level. In our opinion, when researching modern methods and indicators of food safety, it is appropriate to pay attention to the methods tested and currently used by international organizations or specialized entities of individual countries.

FAO is one of the leading international organizations not only in theoretical understanding of food security problems, but also in its assessment. The FAO methodology makes it possible to assess food security both globally and regionally using a set of specific indicators.

The following principles of sustainable food production and agriculture have been established by these organizations:

- increasing the efficiency of resource use plays an important role in ensuring the stability of agriculture.

- to ensure sustainability, strong efforts to preserve, protect and improve natural resources are necessary.

- agriculture that does not ensure the protection and strengthening of livelihood sources, equality and social well-being of the population of rural areas is not considered sustainable.



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- increasing the tolerance of people, communities and ecosystems to external influences is a decisive factor in ensuring the stability of agriculture.

- responsible and effective management mechanisms are necessary for sustainable food production and agriculture[13].

The total number of indicators used by FAO to assess food security at the national level is 43 (31 basic and 12 additional). These data are regularly updated at various levels depending on the requirements of the time. In particular, data on indicators of dietary calorie consumption per capita are updated frequently. The rest of the indicators are less updated, because the data is not available for all countries and at all times.

The Food and Agriculture Organization of the United Nations has developed indicators for the following four areas that are used to assess the food security situation:

1) the availability of the product (in which indicators are used, such as production volumes, yield/productivity, level of reserves, damages and losses, etc.);

2) access to food (the economic possibilities of purchasing the required amount of food for the income in the current state, the transportation of food, that is, the share of paved roads in their total length, the density of railways are analyzed);

3) stability of food supply (sufficiency of food products in different seasons and periods, their prices are evaluated, etc., cases of natural disasters and social upheavals are observed);

4) food consumption (the level of actual consumption is evaluated from the point of view of the satiety of food, that is, its saturation with calories, proteins, microelements, etc.)[14].

The methods used by FAO to collect the necessary data deserve special attention, data on food production, import and export are collected using the balance method on the basis of official national statistics. Information on the condition of transport infrastructure is obtained from the sources of the World Bank, and the impact level of anthropometric indicators is obtained from the World Health Organization.

Also, the total amount of calories for each region is determined depending on the age and gender of the population. Using this information, it is possible to calculate the calorie intake for the entire population. It should be noted that the recorded indicators differ sharply in each country. However, it is observed that most of the developing countries do not have a satisfactory system of collecting statistical data on agriculture, in particular, even the minimum data collection does not meet the requirements of an acceptable information system on food security.

For this reason, FAO experts often rely on survey results based on household surveys. One of the most important modern food and food security information programs in the world's regions is the FAO Country STAT[15] initiative. CountrySTAT is a web-based information technology system for food and agricultural statistics at national and subnational levels.

The system CountrySTAT has launched in most regions of sub-Saharan Africa and is currently being expanded to other African countries as well as outside the region. Concept definitions and classifications used by FAO (in particular, the FAOSTAT system), CountrySTAT has become the country's only information system that organizes, harmonizes and standardizes statistical data from several sources on a universal platform[16].

Among the indicators of food consumption by FAO, anemia among pregnant women (the amount of hemoglobin in the blood is below 110 grams) deserves special attention. Anemia can cause a lack of oxygen for the fetus, which negatively affects its development. One of the main causes of anemia in the world is a lack of iron intake.

Of particular interest is the proportion of people who regularly overeat among additional indicators used by FAO to assess food security. For comparison, for developed countries, the percentage of people who regularly overeat is 45.7% (according to data from 2014-2016), for Germany this figure is 50.3%, for the USA it is 60.8%.

Thus, the use of FAO food security indicators makes it possible to compare different countries according to certain indicators, to monitor the dynamics of changes in their values over time, but they do not allow a general integrated assessment of the food security situation in certain countries.

In particular, in 2021, the volume of production of grain products per capita will increase from 76.7% to 159.1% compared to 1991 according to WHO rational standards of consumption, from 71.7% to 148.6% according to the standards of UzR SSV, and the production of rice and vegetables will increase according to consumption. It increased from 146.9% to 247.3% and from 153.7% to 258.7% (Table 1).



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Table 1. The ratio of the volume of production of the main types of agricultural products per capita to
rational consumption norms (%)[17]

Products	Compared to WHO standards*,%			In relation the Repu	to the SSV st ublic of Uzbel	andards of xistan,%
	1991	2016	2021	1991	2016	2021
Grain	76,7	206,3	159,1	71,7	192,7	148,6
Potatoes	17,9	95,4	85,5	17,8	95,1	85,2
Vegetables and fruit crops	146,9	249,6	247,3	153,7	261	258,7
Fruits and berries	31,1	119,5	96,9	30,2	115,9	93,9
Meat (live weight)	54,6	99,6	103,7	52,4	95,6	99,6
Milk	36,4	76,4	78,0	35,6	74,8	76,3
Eggs (pieces)	24,6	83,2	91,0	21,8	73,8	80,7

*In recent years, WHO has set food consumption standards in kg. changed from to kcal. Since there was no possibility to calculate in kcal, the calculation was done in kilograms.

According to the above analysis, it can be evaluated as the final result of the economic reforms carried out in the agrarian sector during the years of independence. In particular, per capita production of potatoes, milk and dairy products, eggs, fruits and berries, meat (in live weight) has somewhat approached the level of their rational consumption standards. Cereal products are provided on average by 150% compared to the standards of rational consumption per capita. However, this situation does not mean that food security has been achieved in terms of grain production in the country. The reason is that one of the indicators characterizing the safety of food is the state's import dependence on these products. From this point of view, the analyzes show that the trend of importing a significant amount of grain and flour in our country every year is maintained.



Figure 2. Dynamics of grain and flour import in the Republic of Uzbekistan, million tons

This, in turn, is explained by the lack of a direct opportunity to use the grain grown in our republic for consumption as bread and bakery products. For this reason, the assessment of the food security situation based on the volume of grain production and the indicators of dependence on imports of this product is only when it is recognized that the flour and bread industries are highly developed. On the other hand, grain raw materials are mainly grown in irrigated fields. This, in turn, is considered one of the main internal threats that prevent the implementation of the task of achieving sustainable food security in the context of limited water resources and the continuation of this trend in the future.



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