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FOOD SAFETY ASSESSMENT INDICATORS AND METHODS OF THEIR DETERMINATION

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Abstract:

The safety of the food we consume has a direct impact on individual and population health and affects the economic growth of the region where food safety is practised and enhanced. The central goal of the European Commission's Food Safety policy is to ensure a high level of protection of human health covering the whole supply chain. In recent years, great attention has been paid to food testing and the application of metrological tools to support food safety. The global food market and national and international food safety regulations have created a huge demand for the measurement traceability and comparability of analytical results that are independent of time or space boundaries.

Keywords: digital economy, food safety, food products, forecast indicators, purchasing power, influencing factors, healthy competition, quality of life.

INTRODUCTION

Unsafe food is a risk for the consumers health, at the same time, undermines the socio-economic development of countries, limiting people's ability to buy healthy and safe food. Therefore, safe food saves lives, improves consumer health and contributes to economic growth in countries where there are high food safety standards. Food safety refers to all practices that are used to keep our food safe and involves handling, storing, and preparing food to prevent infection and to maintain enough nutrients for us to have a healthy diet. Nowadays, food safety is being tested by the globalization of food supply chains, which have become very long and made up of numerous participants such as producers/farmers, processors, co-packers, distributors, retailers, and consumers in national and international trade. Countries must ensure the safety and quality of their foods that enter international trade but in addition, they must ensure that imported foods comply with national requirements. In the justification of this definition, as important elements of the concept of food security mentioned in the Rome Declaration on Universal Food Security, physical (quantitative) and economic access to food, food independence, reliability and sustainability and added a social aspect to it (Figure 1)

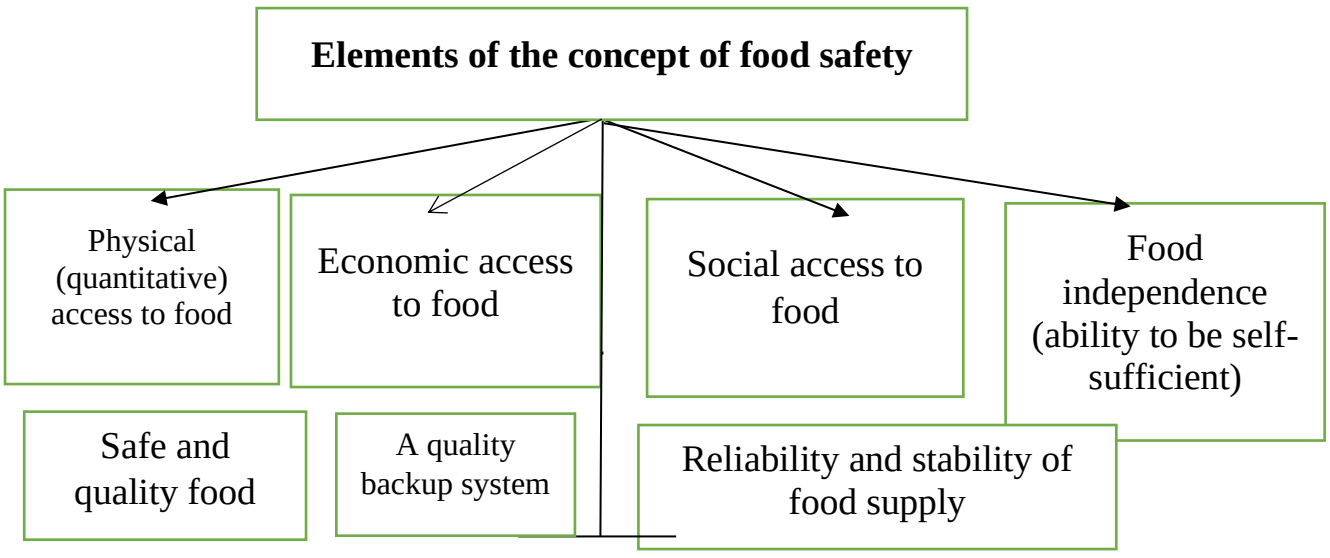

Figure 1. Elements of the concept of food safety

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Here, physical access to food means that people have access to safe and nutritious food in sufficient quantities. In order to achieve this, food products will be available in sufficient quantity and assortment in accordance with the standards of consumption accepted on the territory of the country, and their delivery to the population should be continuous. In order to create such an opportunity, state control over sources of internal and external supply of food products and their stocks will be established.

Economically, all social strata of the population are provided with food products in sufficient quantity and quality, so that every citizen of the country, regardless of his age, property and social status, has the necessary amount of income to have a minimum set of food products. represents that it should be. Such an opportunity and conditions are created by ensuring a sufficient level of income of the population and controlling the optimal price level of food products. Also, residents will have to try to provide themselves with food products in their homesteads and farmyards.

LITERATURE REVIEW

Social access to food products means supporting the population in need of social protection, providing safe food in sufficient quantity and quality on the basis of financial assistance.

Food security is the ability of a national food supply system to minimize the effects of seasons, climate and other changes. The stability of food supply is the development of the national food supply system on the scale of expanded reproduction. The concept of food security also requires the country to achieve independence and self-sufficiency in basic food products. Having studied this, we added the process of applying a quality reserve system to the concept of food safety as an element. It involves the use of local and innovative methods to maintain the quality of seasonally stored food for a long time.

Food security for everyone includes reducing waste through innovation, improving the quality of food and nutrition, avoiding overeating, providing enough macro and micro elements in food, and balancing energy and calories (Figure 2).

The types of food and nutritional characteristics are influenced by the religion, customs, advertising and psychological state of the population.

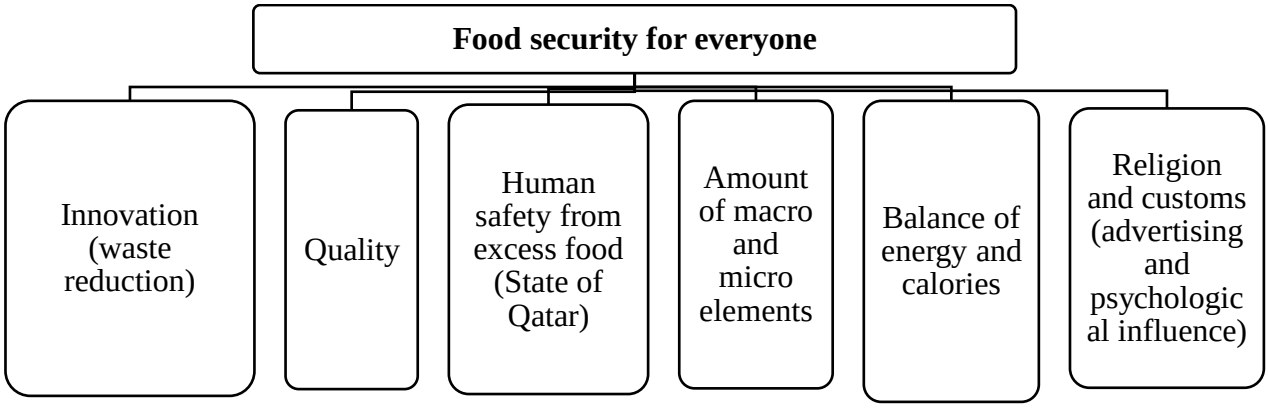

Figure 2 Elements of food safety for humans

In order to form the most complete definition of "food safety", it is appropriate to distinguish its levels and the principles of its provision.

Taking into account these principles and the level of food safety, more precise definitions can be formulated:

1. Family, household, human food security is the continuous (at any time of the day) natural, physical, social and economic availability (of natural origin, without genetic modification) of safe basic food products to medical standards for every person physical, social and economic comfort that ensures a healthy, active and fulfilling life in terms of appropriate quantitative and qualitative composition.

DATA AND METHODOLOGY

Assessment of the food security situation of the population is carried out using the following indicators:

- constant availability of food products in all regions of the country in the amount and range that meet the demand;
- the possibility of consuming food at a minimum level for all consumers, regardless of their social status and place of residence;

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- safety of food products - the absence of substances that make this product unusable or dangerous for humans;
- the quality of food products, i.e. daily consumption of the required number of calories and nutritional components by a person depending on his age and field of activity.

In this case, the quality of nutrition is ensured by the combination of protein, fat, carbohydrates, vitamins, macro and microelements in the food, which are in accordance with the rational standards recommended by the authorities.

When determining the demand for food products, it is determined based on the state of a number of economic and social indicators. The main indicator that helps to determine future demand is the level of expected population income. This indicator, in turn, is formed depending on the level of national income and the size of the gross product. The level of employment and labor productivity of the population also indirectly affects the level of income and the composition and level of demand for agricultural products. A study of population groups by income level shows that there is a relationship between the level of consumption and the level of income. The change in the demand for food products according to the level of income can be determined by its elasticity coefficient. This indicator shows how much a change in the level of income will change by 1%.

According to the research of Engel, a scientist dealing with food security issues, as the income of the population increases, their expenditure on food products decreases in terms of share. As the income of the population increases, the demand for food decreases, and on the contrary, with a decrease in income, the demand increases (Engel's law).

The level of elasticity of food prices depends on a number of factors, the main of which are:

- exchangeability (the more exchangeable goods are, the more elastic the level of demand for them);
- the structural share of the goods in the consumer's budget (the higher it is compared to the goods, the higher the elasticity of the goods);
- time factor (demand becomes more and more elastic over time);
- shortage of goods (the higher the level of shortage of goods, the lower the elasticity of the goods);
- the level of intensity of the need that the same product satisfies (daily and periodic).

In addition to the main threshold values and indicators of food safety assessment proposed in the documents of international organizations, it is necessary to take into account and evaluate the potential level of the country in terms of food safety according to the following directions and criteria:

- the production potential of agriculture, it is evaluated according to the available production capacities, land and labor resources;
- the level of development and stability of agricultural production, taking into account the actual quality of existing techniques and technologies, the results of assessing the financial and economic status of ASM branches and organizations;
- level of provision of production resources in our country, including funding from the budget and other sources;
- the quality of agricultural products and food products produced by organizations in our country;
- the volume of imports, including in comparison with domestic production and the population's needs for food products;
- the mechanism of influence against import intervention with the dvaraja of openness of food products;
- level of greening of the network in terms of environmental pollution and the use of prohibited drugs, technologies, including genetically modified organisms (GMOs), growth promoters, antibiotics, etc.;
- compliance of food safety requirements with legal legislation, the system of regulatory documents, directions of state agrarian policy, and world trends and standards;
- threats and hazards to food safety.

Indicators of food safety

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 basic food products;

b) quality indicators:
- level of housing provision;
- employment and unemployment;
- financial security;
- openness of education;
- free access to healthcare services;
- peace and security in society;
- healthy ecological situation.

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

- the quality of food consumption of the population - the energy value of the ration consumed by 1 person in one day should not be less than 80% of

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the accepted consumption basket, the consumption of products for 1 person in 1 year (90-100% of the medical 'yori), animal protein of the total protein (not less than 50%);

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

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

- the ability to consume food products - the rate of growth of agricultural products (not less than 5-7% per year), the share of profitable enterprises (not less than 60%) , the stagnation indicator of grain production (at least 75%), the ratio of debtor and creditor debt of organizations (at least 40%), the total ratio of investments in agriculture (at least 10%) without);

- 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%), consumption of food products, taking into account the real income of the population wealth growth (not less than 1%), total share of low-income population not more than 8% in urban and 10% in rural areas), level of income differentiation (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%), etc.;

In assessing food safety, the total share of 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 (counting as meat) - 85%;
- milk and milk products (in terms of milk) -90%;
- fish products -80%;
- potatoes -95%; table salt - 85%.

Food safety is evaluated by groups of 10 different types of food products (cereals, milk, meat, sugar, vegetable oil, potatoes, vegetables, fruits, eggs and fish) and the following levels:

- healthy nutrition - science-based nutrition, which has nutritional value in the optimal ratio of macro and microelements necessary for the optimal life and activity of every person, regardless of age, gender, level of health, field of activity is provided with the size and types of food products;

- risk is a situation and processes that negatively affect the system of ensuring food safety, and is damage to the volume and quality of food production, its energy properties;

- food safety indicators are evaluation indicators for food safety control, planning and monitoring;

- the occurrence of negative consequences and danger in the agrarian economy and social sphere as a result of a sharp deviation of the permissible indicator values from the specified limit (minimum and (or) maximum).

Determining the nutritional level of the population is based on the recommendation of the Food and Agriculture Organization of the United Nations (FAO) and is divided into the following groups (kilocalories per person per day):

• the first (2300-2800 kcal) - there is no hunger and malnutrition among the population, but the food ration is insufficient;

• the second (2800-3600 kcal) - the resources are sufficient to meet the needs of the population, but the diet is not balanced according to the balance of the diet and the composition of micro-macro elements;

• the third (3000-3500 kcal) - sufficient level of consumption in terms of the composition of the main components and energy value;

• the fourth (3000-3500 kcal) - a balanced diet aimed at the consumption of ecological products, improving the health of the population of all strata and increasing its number;

• the fifth (3000-3500 kcal) - nutritional composition that ensures a healthy lifestyle and active life extension.

The level of food security achieved in terms of agricultural development in a certain period can be assessed in terms of the following indicators:

1. Per capita production of basic agricultural products. With the help of this indicator, it is possible to evaluate the dynamics of the reproduction process in this sector of the economy, taking into account the change in the population during the period under consideration.

2. Compliance of agricultural products with the standards recommended by the Ministry of Health of the Republic of Uzbekistan and international standards.

In accordance with these standards, it is possible to recommend the quantity and quality composition of the production of agricultural products to ensure a sufficient level of their consumption per capita.

3. Main financial and economic indicators.

The food security of individual households is mainly influenced by per capita income, since the actual food consumption of each person depends on the level of income. Incomes, in turn, are used for wages of working members of the family, pensions and social benefits of the disabled, pensioners and low-income strata of the population; depends on income from individual activities. In this case, there is a correlation of the expenditure on food products with real money incomes, changes in agricultural products, ASM food and processing industry products.

The subsistence minimum is determined based on the set of goods and services of the minimum

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consumption basket, which consists of the minimum income for one person equal to the value of the minimum consumption basket, which ensures the satisfaction of the minimum biosocial needs of a person. With this in mind, the subsistence minimum is intended for:

- assessment of standard of living;
- determining the level of poverty;
- justification of the directions of social policy;
- implementation of measures for social support of the population;
- justification of the minimum amounts of wages, pensions, allowances and other social payments.

The impact of the mentioned factors on food safety can be assessed based on the following indicators of food consumption:

- assessment of the purchasing power of the population's income: the ratio of the minimum and average monthly wages, the minimum pension to the subsistence minimum:
- if the value of this ratio is equal to 1, the level of consumption of food products corresponds to the minimum consumption basket.
- if the value of the ratio is greater than 1, the level of food consumption is greater than the minimum consumption basket.

CONCLUSION

FAO uses seven indicators to assess food security:

1 Comparison of the world grain market reserve to consumption, which helps to determine the level of food security and guarantee during emergency situations (normative-17%, that is, the grain reserve should meet 60 days of consumption) .

2 Comparison of supply and demand of grain exporting countries (Argentina,

3 Australia, Canada, EU, USA).

4 Comparison of transitory reserves of the exporting countries by total grain and its types with domestic consumption (for food and feed purposes).

5 Trends in grain production in India, China and CIS countries

6 (average annual growth in the last year and the next 10 years).

7 Changes in grain production in grain-importing developing countries.

8 Grain production in developing countries except China and India

release trend.

9 Average annual export prices by grain types.

The state of food security is evaluated by two indicators: the stock of grain left for storage until next year's harvest, and the volume of production per capita. It is considered safe that the reserve level is not less than 17% of the annual consumption. Changes in inventory allow us to compare production and consumption. A critical decline in global reserves means global food insecurity and an increase in grain prices.

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