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The main criteria and levels of ensuring food safety

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Abstract: food safety is an important element of national security, therefore its provision is one of the most important tasks of any country. The strategy and tactics of ensuring food security of the country should be based on the results of an impartial assessment of its level in the cross-section of regions. In the article, the criteria and indicators for evaluating the integral indicator of food security in the region, that is, five criteria (physical and economic availability of food, nutritional balance, food quality and safety, stability of the food system), each of them it is proposed to describe one, a set of indicators is defined.

Key words: food security, region, food security criteria and indicators of the region, evaluation, integrated indicator of food security.

Food security is a state of reliable protection of the vital interests and basic foundations of the existence of the individual, society and the state from internal and external threats, in which it is possible to provide the main types of food through our own production. with the mandatory priority of the weakest, disadvantaged groups and the entire population of the country, provided that there is physical and economic availability of food products in the quantity and quality necessary for the full or maximum maintenance and preservation of human life and capacity. independence of the state from external sources of food.

The national interests of the state in the field of agro-food include:

1) to ensure the necessary volume of its own food production;

2) maintaining the state food stock at a normative level;

3) ensuring compliance of the quality of produced and sold food products with quality and food safety standards;

4) ensuring the necessary standard of living, decent level and high quality of healthy life of the population;

5) ensuring the creation of an effective management system of the agrarian sector of the economy;

6) expanding the production of competitive food products for export;

7) development of the material and technical base of agriculture and processing industry;

8) implementation of a single scientific and technical policy in the agro-food complex;

9) implementation of state control over the food market (including production, external and internal supply, accounting and control of food supply).

Threats to food safety are divided into internal and external. Internal threats include: 1) increased dependence on food imports;

2) excessive openness of the economy;

3) criminalization of economic relations.

External threats include:

1) technological blockade, the risk of which is increasing due to lagging behind in the

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scientific and technical sphere;

2) the loss of foreign and foreign trade markets;

3) excess production of food products in other countries;

4) economic and financial dependence on other countries.

Food security is a functional, organizational, resource and technological (economic, social and environmental relations) system formed from interrelated subsystems, the main goal of which is reliable (continuous), adequate supply the resource structure system of the demographic population consisting of quality satisfaction of the population's need for essential (basic) food products.

The system-creating factor of the formation of this system is the agro-industrial complex, all of its sub-complexes are aimed at solving the problems of ensuring food security and food independence of the country.

The functional-purpose subsystems of the food security system include the agro-industrial complex, the sale and distribution of food products, the subsystems of food stocks and consumption. The supporting subsystems are: management; financial assistance; information supply; logistics; technological support; research and innovation.

Food safety includes horizontal and vertical components. At the same time, the horizontal structure involves considering the country's food security as an integral part of national security.

The place and role of food safety is reflected in the interrelationship with other components of the national security system.

Thus, the external political security of the state is largely determined by the level of solving the food problem in a given country. The dependence of the state on the supply of food raw materials, food products and means of production to the agro-industrial complex leads to the complete or partial loss of the country's geopolitical position and sovereignty. However, the problem of food security should not be considered only from the point of view of limiting the volume of food imports, because the country is not protected from the consequences of the population's consumption of genetically modified agricultural products. Annual sales of transgenic products (corn, soybeans, chicory, potatoes, pumpkins, pumpkins, sugar beets, tomatoes, radishes, cotton and flax) in the world exceed 20 billion dollars. In this regard, it is necessary to create a legal framework to limit control over the production and use of such products.

The military-strategic security of the state is largely related to the supply of food to the armed forces, as well as the size and quality of the food supply. Therefore, food security is an important condition for ensuring the state's defense capability. At the same time, military-strategic security helps maintain the material and technical base of agriculture and the entire agro-industrial complex, allowing them to function without the effects of the devastating effects of war.

Economic security issues are directly related to food production issues. The general state of the economy largely depends on how successfully the agro-industrial complex operates. Rapid development of the agro-industrial complex, in particular, its leading branch - agriculture, is a decisive condition for the consistent development of the economy, not for increasing and improving the quality of food resources while reducing production costs. whole. In this regard, it is legal to use the indices of production volumes of the main sectors of the agro-industrial complex as indicators of the state of economic security, and the stagnation of agriculture can be considered a serious threat to the country's national security. in the economic sphere.

Direct or indirect way related to the destruction of components of the agro-industrial

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complex system as a threat to economic security, payments for the import of food products and means of production for the agro-industrial complex can be considered as losses. At the same time, the economic condition of the agro-industrial complex is largely determined by the state support of the agro-industrial complex, the size of which depends on the capabilities of the federal and local budgets, and is determined by the level of tax revenues. enterprises in the field of production.

An important aspect of socio-demographic security is population health, quality and life expectancy. The level of these indicators of national security is determined by how nutritious the diet of the members of society is, the resistance of people to diseases, the level of aggressiveness of behavior and the level of labor productivity.

Food and energy security are also interrelated. Thus, the US is the largest exporter of food and follows a policy of importing energy resources combined with a policy of protectionism regarding its natural resources. Income from food exports allows Americans to cover the costs of energy imports. At the same time, US agriculture is the largest consumer of energy resources, accounting for approximately 17% of all energy expenditures.

The relationship between transport and food security is that the insufficient development of transport infrastructure leads to crop failure, food spoilage during transport, pesticides, mineral fertilizers and agricultural products to agricultural producers. It is manifested in the fact that it can lead to a delay in the delivery of equipment. All this has a negative impact on both food production and consumption.

Environmental security problems are directly related to agricultural production, because with the development of production forces, the production of agricultural products, raw materials and food products is more and more subject to changing environmental factors under its influence. depends. The annual productivity of the planet's vegetation is estimated at 160 billion tons, of which humans use a little more than 5 billion tons, or 3% of all primary production.

Nevertheless, the economic and social development of society is clearly in conflict with the biosphere's limited resources to produce and sustain life. There is a decrease in land and ocean resources, irreversible loss of various plants and animals, man-made disruption of the biogeochemical cycle of substances, pollution of all components of the natural environment, simplification and degradation of ecosystems. In turn, the degradation of natural resources hinders the development of plant breeding and animal husbandry. A decrease in the quality of land resources leads to a decrease in productivity, a deterioration in the quality of products, which causes the problem of food security in the countries of the world to worsen.

As a result of the analysis of the place of food security in the national security system, it can be concluded that all the subsystems of the national security system are interconnected and interdependent.

The figure shows a diagram of the hierarchy of food safety objects developed by the author, in which the following safety levels are highlighted:

1) individual (personal);
2) local (households);
3) local (city, district, municipality, free economic zone, biosphere territory);
4) territorial (provinces);
5) regional;
6) national.

In turn, national food security is included as a subsystem of international food security and

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global (planetary) food security of neighboring countries in a certain economic-geographical region.

We recommend the following system of measures for state regulation of the agro-industrial complex, which will help to solve the food problem:

- improvement of the system of economic relations in the field of production, purchase, primary and deep processing, storage, transportation and sale of agricultural products;

- an optimal combination of state and market regulation of prices for agricultural products in order to revive the effective demand of the population and increase the competitiveness of local food products in domestic and foreign markets;

- implementing flexible taxation of agricultural producers, giving tax incentives to producers investing in the development of priority industries and products or following the principle of sustainable development of production in compliance with environmental standards;

- conducting a moderate protectionist policy to protect the interests of domestic producers;

- constant monitoring of the domestic food market and food safety of Russia, creation of mechanisms of public control over appropriateness of imports and quality characteristics of imported food products;

- modernization and technical re-equipment of processing industry enterprises, introduction of advanced technologies and quality management systems (ISO 9000, ISO 14000);

- creating a data bank of innovative projects and advanced technologies in the agro-food complex and periodically informing food market participants about them;

- creation of conditions and activation of processes for domestic food products to enter foreign markets, promotion of export of grain and its processing products;

- promotion of import of machinery and equipment for enterprises producing means of production for agriculture and other parts of the agro-industrial complex; means of production for promising industrial technologies of production and processing of agricultural products; breeding animals of high-yielding breeds and seeds of high-yielding and high-protein crops; patents and licenses that help scientific and technical re-equipment of agricultural industries;

- to increase the investment attractiveness of the agro-industrial complex, to re-equip the material-technical base of the agro-industrial complex, including the urban wholesale food markets, and to introduce tax and other incentives that will help to form a logistics system. a network of training centers in large cities and rural settlements;

- development of equipment leasing system for processing industry enterprises;

- consistent implementation of the policy of import substitution, filling the domestic market with a wide range of high-quality and competitive products of local production, reducing the import of food products into the country that can be produced in the country;

- regulation of the main strategic types of food: grain, meat, milk imports;

- rational placement of agricultural raw material processing enterprises throughout the republic, expanding the practice of building enterprises, workshops and production facilities directly on farms;

- optimization of production capacities of processing industry enterprises;

- development and implementation of the "green revolution" mechanism in agriculture, which includes: introduction of new high-yielding varieties of local and foreign selection in order to dramatically increase food resources; mechanization and chemicalization of agriculture; land drainage and irrigation; restore the fertility of soils damaged by humus; stimulation of the

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ecological and economic system of farming;

- to protect the population from low-quality food products by improving the work of standardization and certification services of goods.

Currently, there is no common point of view among local researchers on the criteria and indicators that comprehensively describe the state of the regional agro-industrial complex and the food market from the point of view of ensuring food safety. It should be noted that there are universally recognized criteria and indicators of food safety at the national level, but at the regional level, it is important to clarify the scope of such criteria and indicators, taking into account the specific characteristics of the region (of course, their composition). different from national).

In our opinion, it is appropriate to present a typical list of criteria included in the integrated indicator of food security in the region in the following form:

1. Physical presence of food.
2. Economic convenience of food.
3. Balanced diet.
4. Food quality and safety.
5. Sustainability of the food system.

Thus, the food security of the region is a complex feature, each of its criteria can be described using a number of indicators. For the quantitative assessment of the food security of the region, it is acceptable to use the method of combining a set of indicators describing the criteria of complex characteristics: physical and economic availability of food, nutritional balance, food quality and safety, stability of the food system. Of course, there is a certain interdependence between the above criteria of ensuring regional food security, and their recognition implies the need to consider the components of a complex characteristic in terms of their interaction. requires. However, this approach can significantly complicate the process of assessing food security in the region. In order to avoid the spread of data, it is necessary to exclude from their set the mutually interchangeable indicators that describe each criterion of food security in the region.

Let's describe each criterion we chose to assess the food security of the region.

In our opinion, the physical availability of food products is the ability of the population to purchase vital food products in the amount and range necessary to meet the physiological needs of a person in a trade network, market or on a personal basis. Goods that cannot be used for the normal life of the population and are characterized by the following are vital food products:

cover the energy costs that occur during the life of the human body;

to ensure the possibility of physiologically harmonious development of children;

to support the natural and active longevity of the population;

contributes to the prevention and treatment of various diseases.

The physical availability of food products implies their continuous delivery to places of consumption in volumes corresponding to effective demand and physiological norms. In addition, physiological standards mean a diet consisting of products in the volume and proportions in accordance with the modern scientific principles of optimal nutrition, taking into account the existing structure and dietary traditions of the majority of the country's population.

This criterion mainly describes the supply of food products and is primarily determined by the level of development of agricultural production. An important aspect of the physical availability of food is the extent of the trade network in the region where people can buy food.

The economic availability of food products implies the possibility of their use by all

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segments of the population due to the existing effective demand. According to the doctrine, the economic convenience of food is determined by the possibility of purchasing food products at current prices in a volume and assortment not less than the established rational consumption norms, which is provided by the appropriate level of income of the population. This criterion of food security in the region is determined by the level of economic and social development of the state. It depends on the consumption of food products in the required volume and assortment of different population groups, their purchase at market prices, production on their farms, etc. There is a continuous deepening of the income stratification of the population in the country, as the difference between the extreme groups with the lowest and highest income levels is very large.

Increasing the economic opportunities of food products should be implemented primarily on the basis of positive economic changes manifested in the increase of incomes of the population, especially the poorest sections of the population, and reasonable retail prices of food products, as well as on the basis of a strong program. support them from the earmarked budget.

1. Balanced nutrition includes eating enough high-quality food for an active and healthy life with the appropriate composition of macro and micronutrients for a balanced diet.

A balanced diet is based on the fact that food consists of various nutrients: fats, proteins, carbohydrates, vitamins, fatty acids, mineral salts, trace elements, etc. Important substances that are not formed in the human body, but which enter with food, are of particular importance. These substances include essential amino acids (fatty acids (linoleic, linolenic, arachidonic)). The group of important substances also includes vitamins and mineral elements that maintain and balance the molecular composition of various tissues of the human body and cover their costs. life process. Based on the theory of balanced nutrition, daily norms of consumption of certain substances have been developed.

Humanity does not always follow a balanced, high-quality diet and prefer refined and light foods rich in vitamins. Low-income sections of the population are characterized by a monotonous diet, which also affects the availability of vitamins. All vitamins except vitamin D can be obtained from regular foods with a balanced diet.

Since food security is measured by the caloric content of the population's daily diet, nutritional balance includes the caloric content of food. Caloric content indicates the energy value of food products or diets: the amount of heat released when food or nutrients are oxidized in the human or animal body. The energy received by a person is used for the physiological functions of the body. The energy equivalent of food is the amount of energy released during the decomposition of 1 g of any substance.

According to FAO and World Health Organization (WHO), the average nutritional requirement for one person should be 2300-2400 kcal per day. This indicator varies depending on a person's gender, age, profession, as well as natural and climatic conditions. If this indicator is below 1800 kcal, then clearly defined malnutrition appears, and when this indicator exceeds the limit of 1000 kcal per day, open starvation (physical lack of food) appears .

According to the FAO, the diet should be complete and the amount of protein should be at least 100 g per day. A diet without not only calories, but proteins, primarily animal sources, as well as fats, vitamins and trace elements, is called incomplete. This is caused by constant poor nutrition and monotony of the diet (one type of product dominates consumption).

The real average calorie consumption in the world is 2700 kcal per day, in economically developed countries it is 3400 kcal per capita, and protein consumption is about 100 g per day. It

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should be noted that in developed countries there are social groups with consistently low levels of consumption, which constantly require state support.

The quality and safety of food products includes the provision of such a set of product characteristics that determine its suitability to meet certain needs in accordance with its purpose. This is done by achieving the full nutritional level of the population through the consumption of high-quality food products. In English, the term "food safety" is equivalent to the local concept of food quality and safety. Quality as an economic category is one of the main factors of competitiveness of agricultural products today, and the problem of increasing it is complex, because it includes scientific-technical, social and economic aspects.

The stability of the food system is determined by the ability to provide the population with food products of appropriate quality in the required amount (taking into account the formed state food reserves) both in normal conditions and in emergency situations (wars, natural disasters, man-made). made disasters). Sustainability refers to the development of a food system in an extended mode of reproduction. This is ensured by the high level of socio-economic development of the country, positive economic changes, stable operation of the agro-industrial complex.

The above criteria of regional food security should be expressed in a system of indicators that quantitatively represent its level in accordance with these criteria. For each of the main criteria, a number of indicators can be defined, one of which is the most important for describing the food security of the region according to this criterion. Thus, the main indicator for describing the nutritional balance is the calorie ratio. Such indicators can be calculated directly or be complex indicators consisting of several components.

The indicator of the level of food security in the region is combined both in substance and in the order of detection. A set of indicators is proposed to describe each criterion of the integrated indicator of food security in the region: physical and economic availability of food, nutritional balance, food quality and safety, food system sustainability, each of which has an internal hierarchy. :

Level 1: an integral indicator of food security in the region.

Step 2: criteria and indicators of food security in the region:

1) physical presence of food:

- volume of agricultural products per capita;
- yield/productivity;
- degree of openness of the food market of the region;
- food import coverage ratio;
- the level of development of the trade network of the region.

2) economic convenience of food:

- poverty level;
- population's purchasing power coefficient;
- the average price of a food basket;
- population income concentration coefficient (Gini index);
- consumer price index of food products.

3) nutritional balance:

- calorie consumption ratio;
- power structure coefficient.

4) food quality and safety:

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- food quality coefficient;
- food safety;
- ecological purity of food.

5) sustainability of the food system:

- share of the population employed in agriculture;
- the average salary of agricultural workers compared to the average salary in the region;
- profitability of agricultural enterprises;
- share of harmful agricultural enterprises;
- volumes of food reserves.

Indicators describing the criteria of an integrated indicator of food security in the region were selected taking into account the ability to more fully reflect one or another criteria of such an integrated assessment of security.

Indicators used to assess the level of food security in the region can be quantitative and qualitative. All the quantitative indicators of regional food security proposed in this study make it possible to determine the level of phenomena that characterize food security and to compare its level in different regions, regardless of interregional differences in the composition and level of food production and consumption. will give. At the same time, it is necessary to supplement such indicators with quality indicators for a more complete analysis of the food security of the region. Analysis of the level of food security in the region according to the proposed criteria can be carried out in detail and by calculating the indicators describing the current state of food security in the region and the trend of changes for several years in these five directions. . in this case.

The most difficult task is the quantitative assessment of quality indicators for the assessment of regional food safety, for example, food quality, as a result of non-compliance with standards for the content of substances harmful to human health in food products or the results of non-compliance of products. can be recognized to assess the quality of the whole food supply with established standards. products with only a certain degree of error. In this case, the most used indicator (which only indirectly describes the overall quality of food) can be recognized by the control authorities as the ratio of the amount of products that meet quality requirements to the total amount of inspected products.

The system of indicators proposed in the study on the assessment of food security in the region meets the main requirements for indicator systems:

- it has an acceptable number of input indicators, which should not exceed 25;
- a reasonable balance was achieved between diagnostic and strategic indicators.

The proposed approach is based on understanding the food security of a region as a comprehensive indicator consisting of physical availability of food, economic availability of food, food balance, food quality and safety, as well as food system sustainability. Each of the criteria for food security in the region is characterized by a set of quantitative and proportional indicators that are acceptable for research purposes.

Conclusion

In conclusion, it should be said that the integrated indicator of regional food security, calculated on the basis of the proposed system of indicators, allows to analyze the dynamics of this indicator and to describe its level in order to compare the regions according to this level. The disadvantage of this indicator is that it is somewhat arbitrary to determine the safety or security of food security of a region based on it (it can be seen that the higher the indicator, the better the food security

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situation in the region). On the basis of determining the problem areas with the lowest value of the total indicators calculated within the regional food safety criteria, the priority directions of state regulation, the goals and methods of achieving them within the framework of the food safety system should be determined. food security in the region should be established. Thus, the analysis of the indicators used to assess the food security of the region is an objective basis for the formation of strategies and tactics for its provision.

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