Food Security: Current Status and Development Prospects in Conditions of Risk

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Abstract

The article considers the mechanisms of ensuring food security, risks and threats to its provision. National security policy is an interconnected system of targeted efforts of the state and other political institutions of society, designed to ensure their reliable functioning. The state is called upon to play a central and coordinating role in ensuring food security. The most important elements of the state regulation system should be the following: − stimulation of effective demand of the population; − antimonopoly regulation and increasing the competitive potential of agriculture; − development of market infrastructure; − support for a stable situation on the food market through government injections (interventions); − providing agriculture with affordable loans; − pursuing a policy of reasonable protectionism; − providing domestic producers with conditions for normal competition with foreign producers. The implementation of the state strategy is carried out through a system of specific measures based on qualitative and quantitative indicators - macroeconomic, demographic, foreign economic, technological, etc. The most important element of the national security system is the forecasting of its threat factors. One of the main goals of ensuring national security of any state is to ensure food security. An analysis of current global trends shows that food dependence is becoming a key lever of foreign policy influence for powerful states, determining a country's place in the global community. Food security (FS) encompasses not only the availability of food (quantitatively speaking), but also its quality, safety, and affordability. Key risks include dependence on imported seeds and equipment, climate change, and geopolitics. Opportunities include the development of domestic breeding, digitalization of the agricultural sector, and efficient use of land resources.

Keywords: security, risks, threats, directions, monitoring, policy, availability, mechanisms of provision.

1.Introduction

Food security is the provision of safe, high-quality, and affordable food to the population. Risks include conflict, extreme weather conditions, and economic factors. Public policy aims to create favorable conditions for domestic food production and distribution, while economic policy focuses on ensuring food availability by reducing prices and increasing household incomes.

Food Security Risks

• Extreme weather conditions:

Climate change, droughts, and floods cause harmful effect on food production.

• Economic factors:

Inflation, low purchasing power, and market instability can limit access to food.

• Logistical and infrastructure challenges:

Shortages in food production, distribution, and exchange can lead to scantiness.

• Poor product quality and security:

Negligence to comply with quality and safety standards can lead to public health problems.

Main directions of state and economic policy

• Improving of local production:

The state stimulates domestic agriculture to ensure food security.

• Ensuring accessibility:

Economic policy is designed to create favorable conditions for the physical and economic availability of food for all citizens, such as, through subsidies or support for low-income groups.

• Quality and safety control:

The state sets requirements for the quality and safety of food products and monitors their compliance.

• Support for agriculture:

Providing subsidies, benefits, and technical support to farmers helps stabilize production and prices.

• Infrastructure development:

Investments in transport and warehouse infrastructure improve supply chains and reduce food losses.

• Developing international cooperation:

Participation in international agreements and trade helps ensure access to essential food products.

Ensuring food security is a pressing issue directly related to the sustainable development of the state and the well-being of the population. In the context of urbanization and the growth of the share of the urban population, food security issues in megacities are of particular importance, becoming an integral part of the sustainable development strategy.

The increase in the number of urban residents exacerbates the problem of balanced provision of food resources, given the limited resources, such as agricultural land and infrastructure for storing and transporting products, leading to an increase in demand for food, complication of supply logistics, as well as an increase in dependence on external sources of food.

Urbanization aggravates the situation related to specific risks to food security in megacities, endangering sustainability of the urban food system, while demanding an comprehensive approach to their regulation. Consequently, there is a need to develop an effective policy for managing these risks aimed at reducing dependence on external supplies, optimizing logistics, supporting local production and ensuring the availability of food. In this context, it is important to justify mechanisms that will help minimize these risks and create a sustainable food system for megacities, since food policy remains ineffective without taking into account risk factors.

2.Literature Review

Discussing the issues of ensuring food security, it should be noted that general problems of food security are in the center of attention of the scientific community, which is confirmed by the content analysis of scientific publications in the Elibrary electronic library. The search was carried out using the following keywords: "food security", "food security of a metropolis", "food security of a city" taking into account the morphology, including abstracts, keywords and titles of articles published in scientific journals.

Table 1. *Results of content analysis*

Key phrase	2019	2020	2021	2022	2023	2024
Food security	1 605	1 674	1 699	1 987	2 095	2 206
Food security of the metropolis	2	2	2	1	3	4
Food security of the city	16	31	33	25	34	30

Compiled by the author based on data from the Elibrary library

The results of the content analysis of scientific articles indicate the presence of a scientific gap: on average, over the past 6 years, no more than 2-4 articles per year have been published on the problems of food security in megacities. This problem is partially considered in scientific studies on the food security of cities (16-34 publications per year), but this figure is significantly lower than the total number of publications on food security. In accordance with the approach of A.Kh. Kurbanov, the food security of a megacity is assessed through the prism of the economic state. Ensuring economic security involves saturating the market with food products, achieving food independence, as well as guarantees of physical

and economic availability of food for all categories of the population. An important criterion for food security is the compliance of food products with established technical regulations and their sufficiency to maintain an active and healthy lifestyle (Kurbanov, 2015). Thus, the problem of food security in megacities goes beyond the simple availability of food products on the market. According to the position of M.S. Oborin, M.Yu. Sheresheva and O.V. Shimuk, the problem of physical availability of food is not acute, since the market is sufficiently saturated with food products. However, the key risks to food security remain issues of economic availability of food and a balanced diet (Oborin et al., 2017). Ensuring food security of modern megalopolises is associated with many risks caused by urbanization and the increasing burden on food systems. The main risks include the likelihood of food crises, reduced economic availability of food products and instability of supply. Since most megacities do not have sufficient agricultural land to fully meet the needs of the population (Moronova, 2023), one of the key risks is the high logistical dependence of large cities on external suppliers. The expansion of megacities leads to a reduction in available agricultural land in their vicinity, which limits the possibilities for local food production and increases the vulnerability of cities to supply disruptions.

3. Risks and threats to food security

The set of protective measures for domestic producers, on the one hand, must not contradict WTO law. On the other hand, it must be aimed at increasing the competitiveness of domestic producers, which will allow them to supply the market with raw materials and food, and, consequently, survive, maintain, and strengthen their market position. As we can see, maintaining and further enhancing food security is a task that requires a comprehensive approach. This task requires the participation of government officials, scientists, and business representatives, as well as the trust of rural producers (the main participants in the production process that facilitates import substitution) in new developments and programs to address the food crisis.

Development Prospects. Genetics and Breeding: Priority is given to the development of domestic breeding and seed production to reduce import dependence. Technological Sovereignty: Creation of domestic production facilities for the production of machinery, equipment, and software. System Resilience: Creating sustainable food systems, including reducing product losses and digitalizing production process management. Human Resources: Addressing the shortage of skilled personnel in the agro-industrial complex.

Key areas for ensuring food security: Achieving technological independence (seeds, equipment, IT). Improving product quality (environmental friendliness, nutritional value). Optimizing logistics to ensure physical accessibility. Ensuring food security is associated with risks that can significantly undermine it. The mosst significant risks are divided into the following categoriess:

- macroeconomic risks arising from the decline in the investment attractiveness of the domestic real economy and the competitiveness of local production as well as the dependence of key economic sectors on external economic conditions;
- technical risks caussed by delays in the technological development of domesstic production bases in developed countries;
- Organization of systems for monitoring food safety requirements and compliance;
- agro-ecological risks arising from adverse cliimate change, as well as the consequences of natural and man-made diisasters;
- Foreign trade risk arising from market fluctuationss in foreign countriess and the introduction of state aid measures.

The existence of these risks poses a threat to food safety, which may lead to non-compliance with food ssafety limits. Sustainable economic growth requires the elimination of state regulatory measures:

- less effective demand for food production;
- inadequate development of domestic market infrastructure;

- price imbalances in the markets for agricultural and fisheries products, raw materials and foodstuffs, on the one hand, and for physical and technological resources, on the other;
- Insufficient innovation and investment activities in agricultural and fisheries production, production of raw materials and foodstuffs;
- reduction of national animal and plant genetic resources;
- Lack of qualified staff;
- differencess in living standardss between urban and rural popullations;
- Artificial competitive advantage of foreign products as a result of various state support measures for food production in foreign countries.

State policies on food security must take into account risks and hazards that could significantly weaken it. Such factors include a shortage of qualified staff, price imbalances and modern food market monitoring systems. Risks to food security may include: macroeconomic; external economic; social; natural and climatic

The main threats to food security:
– exceeding the import threshold;
– low level of effective demand of the population;
– price imbalances in the food market;
– shortage of qualified personnel;
– underdevelopment of the system for monitoring and forecasting the development of the agro-food market;
– political threats.

The food security of the state can be considered ensured "…if, in the event of a cessation of the flow of food products from abroad into the country, a food crisis does not occur, which is achieved due to the high share of domestic agricultural raw materials and food in consumption: potatoes - 95%; grain, milk and dairy products - 90%; edible salt - 85%; meat and meat products - 85%; fish and fish products, sugar, vegetable oil - 80%". If we compare these benchmarks with what we have today, then the balance in providing the population with livestock products, primarily meat and dairy products, is most severely disrupted.

4.The main directions of state economic policy in the sphere of ensuring food security

The key directions of state economic policy in the area of food security for 2025 - 2026, based on the Food Security Doctrine, are aimed at ensuring independence through import substitution, increasing crop yields, modernizing the agro-industrial complex, developing logistics, and increasing the economic availability of high-quality food products for all population groups.

Key areas include:

• Production intensification: Improving soil fertility, bringing unused arable land back into cultivation, accelerating the development of livestock farming and land reclamation.

• Technological modernization: Applying updated innovation for the high-tech processing of raw materials, establishing latest infrastructure for the storage and transportation of products.

• Scientific and personnel support includes improving food science, stopping personnel exhaustion, as well as educating specialists for the innovative agro-industrial complex.

• Improving accessibility: Monitoring prices, ensuring the physical and economic availability of food for the population.

• Developing the fishing industry: Intensive use of aquatic bioresources and developing industrial fish farming.

State policy is also focused on achieving food self-sufficiency thresholds (the proportion of domestic production) for grain, sugar, oil, meat, fish, and potatoes.

A country's food security is determined by its level of food self-sufficiency, that is, the ratio of domestic food production to consumption. There are four main factors influencing human food security: utilization, accessibility, availability, and stability. Utilization includes people's ability to prepare food hygienically—which requires fuel and

access to clean water—and to absorb the nutrients contained in it.

Agricultural policy aimed at developing agriculture and ensuring food security is a crucial component of public policy for every country. Therefore, this work is of interest for identifying opportunities to improve the effectiveness of state support for agriculture and food security.

Issues of improving the effectiveness of state support measures for agriculture and ensuring food security in the face of domestic budget constraints and external sanctions are currently among the most significant for government agencies implementing agricultural policy.

However, given resource constraints, it is necessary to systematize state support measures to enhance the effectiveness of agricultural policy. We believe comprehensive support is needed to mitigate the risks of failing to achieve the goals and objectives of program-targeted documents, including: optimization of the current agricultural insurance system (specifically, attracting more insurance companies to regional markets and increasing insurance payout levels), improvement of the mechanism for preferential lending to agricultural enterprises, development and implementation of additional leasing programs for agricultural machinery and equipment, timely adoption of innovative technical solutions and the introduction of new technologies that optimize resources and protect the environment, and prevention of a decrease in funding levels relative to approved levels.

Increased exports will offset the decline in domestic demand, allow for the sale of excess product in warehouses, ensure increased capacity utilization, and provide jobs for rural residents.

Government support is critically important, but today it requires greater consistency and regularity. A long-term agricultural policy with large-scale government support for farmers and the creation of conditions for technological breakthroughs is needed. The above measures will enable us to cope with macroeconomic and regulatory shocks in the long term and implement technological modernization, import substitution, and growth in agricultural exports and food security.

Thus, ensuring food security for the national economy as a whole and its individual territorial entities in particular remains a central element of the economic and social policy of any state in the 21st century. Given the escalation of external risks and threats to national security, including the volatility of global raw materials and commodity markets, as well as the growing burden of environmental problems that directly or indirectly affect the country's food supply, the urgency of developing reliable criteria for formulating a food basket is growing.

Food security serves as the foundation for ensuring public health and long-term economic development; it cannot be achieved without a clear understanding of the minimum and optimal set of products (and in what quantities) required to sustain life and a high quality of life for citizens.

The problem of ensuring a stable, necessary, and sufficient supply of food for individuals, households, regions, and countries is of permanent importance. It's no coincidence that researchers have noted that even before the concept of food security was categorized, algorithms for providing people with food not only existed and were institutionalized, but also constituted a crucial factor in socioeconomic differentiation in societies of all levels.

Having systematized and generalized existing concepts of food security, we propose a new approach to the essence of food security as providing the country's population with accessible food products of sufficient quantity and quality to ensure the normal continuation of healthy life, while addressing the priority task of managing the country's land resources suitable for agricultural production and the balanced management of a system of various international and domestic measures. This statement differs from many others in its recognition of the subject for which any food security strategy is implemented: the healthy individual. Their needs should become the primary guideline for adjusting planned and implemented action plans to ensure food security for population groups of different ages, genders, levels of physical activity, and daily physiological requirements in kilocalories (Kapustina, 2023). It would seem that target benchmarks have been set, but the overall situation across various regions and the country as a whole remains unchanged, according to researchers.

Mechanisms for ensuring food security of a metropolis are a system of measures and tools aimed at creating a sustainable supply of high-quality and affordable food products to the population. The key risks of food security of modern megacities, as well as the mechanisms for managing these risks, are systematized in Table 2.

Table 2- *Food security risks of the metropolis and management mechanisms*

Risk category	Risk Description	Mechanisms for ensuring food security
Dependence on external supplies	Limited agricultural space in megacities makes them vulnerable to supply disruptions due to crises, sanctions or pandemics	Development of local agricultural production, support for urban farming, creation of strategic food reserves
Insufficient development of storage and logistics infrastructure	Limited warehouse capacity and imperfect storage systems lead to product losses and reduced quality	Improvement of warehouse and transport infrastructure, introduction of modern storage and processing technologies
Uneven access to food for different segments of the population	Low incomes, rising unemployment and economic crises limit access to quality products	State support for the poor: food subsidies, social stores, subsidized food programs
Excessive demand and price spikes	Panic buying caused by political and psychological factors leads to shortages and rising prices	Regulation of market distribution of essential goods, state interventions, informing the population
Environmental and climate threats	Climate change, soil degradation and water scarcity are reducing food production	Implementation of sustainable agricultural practices, optimization of resource consumption, development of adaptation measures
Growing volumes of food waste	Rising food losses in cities increase food insecurity	Creating efficient processing systems, reducing food losses, optimizing transport chains
Lack of long-term strategic planning	Insufficient consideration of future threats leads to ineffective food policy	Development of strategic plans for food security, risk monitoring, integration of environmental and economic factors into the policies of megacities

Developed by the author

Therefore, the scientific literature currently lacks an economic justification for an indicator whose characteristics would allow for the integrated inclusion of two parameters: an assessment of the level of food security for the population of various socio-demographic and economic clusters, as well as rational planning for the state's participation through various entities, primarily the agro-industrial complex, in ensuring a decent quality of life for citizens. This integrated indicator would serve two roles: evaluative (have we achieved the desired level) and predictive (how to maintain food security or improve its substantive economic basis). It appears that the food basket could serve as such an integrated indicator. Updating approaches to analyzing and reintroducing it into scientific discussions, searching for innovative approaches to its essence, and developing methodology for its formation is particularly urgent today.

Thus, ensuring food security cannot be limited only to increasing the volumes of production and supply. Regulating market distribution of vital products requires additional mechanisms, which aims at preventing panic buying and irrational price hikes.

Environmental and climate change are also sources of risk to food security in megacities. Changing weather conditions, soil degradation and water shortages affect food production volumes, requiring the introduction of sustainable agricultural practices and optimization of resource consumption (Voronina, 2022). In addition, the increase in the volume of food waste in cities requires the development of effective recycling systems, improvement of transport and storage infrastructure, and reduction of food losses (Walls, 2019). In this context, strategic planning plays an important role, which should take into account not only current threats, but also prospective climatic and environmental factors that can affect the food security of modern megacities (Walls, 2019). Thus, strategic planning becomes a tool for long-term food stability, allowing the integration of environmental and economic aspects into the state policy

of food security of megacities.

At the level of municipal entities of the region, through the implementation of long-term target programs developed by regional authorities, the negative impact of the above risks is eliminated and one of the strategic goals of economic policy is achieved - sustainable development of the agro-industrial complex.

Due to their specificity, food systems of megacities are highly dependent on external supplies, which makes them vulnerable to crises, trade restrictions and other external economic shocks. The key mechanism in this context is the development of local and agricultural production; it is also advisable to form strategic food reserves to compensate for short-term deficits and stabilize the market in the event of undesirable events. The introduction of modern solutions in the field of storage and processing of products allows us to reduce logistics costs and reduce food losses that occur during storage and transportation. Economic inequality and social stratification of the population are sources of risks in ensuring food security in megacities, which requires the introduction of a social support mechanism aimed at increasing the availability of food for the most vulnerable segments of the population. Among the support mechanisms, we can also highlight food subsidies, the creation of a network of social stores and the implementation of subsidized food programs; the importance of these mechanisms increases in the context of crises accompanied by unemployment and a reduction in real incomes of the population. An important mechanism for stabilizing the food market in megacities during periods are government interventions that help contain price fluctuations.

Ensuring food security in the context of developing large urban agglomerations is a key challenge for modern socio-economic policy. As population grows, their high dependence on external supplies increases, and their vulnerability to sudden disruption makes it necessary to reconsider traditional approaches to food system management. In the periods of growing economic instability, megacities are especially exposed to risks associated not only with physical and economic availability, but also quality of food products.

In this regard, it is vital to analysis food security mechanisms conducted within various levels of government, including their adaptive capacity in response to various types of threats. Because megacities differ in their economic development, geography, and layout, they use different ways to supply food, which makes it important to understand these systems in a clear and scientific way.

Key mechanisms to ensure food security in 2026, and beyond are supposed to switch to sustainable food systems, the diversification of supply chains, and government assistance for the domestic agricultural sector. These resources cover building regional infrastructure, applying innovative agricultural technologies, grain reserves, and starting new government programs.

Key mechanisms to ensure food security by 2026:

• Sustainable agriculture: These resources include the development of regional infrastructure, the use of innovative agricultural technologies, grain reserves, and the creation of new government programs.

Key mechanisms to ensure food security by 2026:

Developing environmentally sustainable growing methods and reducing food waste.

• Sustainable agriculture: Promoting environmentally friendly farming methods and cutting down on food waste.

Diversification and supply chains: Preventing threats related to economic disruptions and climate change

• Strengthening food systems: Advancing urban and peri-urban food supply systems.

• State control: Launching new government programs targeting increasing food sovereignty.

Resources and factors:

• Grain resources: Using grain reserves as a basis for food security.

• Innovation and technology: Applying digital solutions to increase yields and control supplies.

• Domestic production: Increasing domestic production to prevent need on imports.

• Risk mitigation: Decreasing the impact of economic shocks, climate change, and military conflicts.

By 2026 and beyond, food security will be determined by the ability of countries to meet their population's needs from their own resources in the face of global uncertainty.

Food security issues have always been pressing. Against the backdrop of current economic changes and shocks, ensuring food security is a national priority requiring attention at all levels of government. To ensure food security, it is important not only to minimize the impact of factors destabilizing the food system, but also to proactively identify the most significant risks and threats and implement timely containment mechanisms to neutralize them.

By 2026 and beyond, a country's food security will be influenced by its potential to address its population's need using its own resources, even amid global uncertainty. Ensuring food security has always been vital issue. However, it has become a national priority requiring attention at every level of government against the backdrop today's economic changes and shocks. Achieving this goal demands not just minimizing the impact of factors destabilizing the food system, but also actively identifying key risks and threats and taking timely action to manage them.

5.Mechanisms and resources for ensuring food security

Making sure cities have enough food means understanding how all the pieces fit together — from central and local governments to economic incentives, infrastructure, logistics, and social programs that keep food flowing reliably. Increasing food availability isn't just about growing more; it also means investing in farming productivity, improving how food is distributed, and updating policies to support the system. Local markets are important too, helping to balance the often-unpredictable output from small-scale farmers.

Current conditions revealing these characteristics, attach critical importance to address the issue of food security. Global institutional changes conducted within a short period of time, establishing new rules of conduct which require maximum autonomy for national production and technological processes, as well as elevating import substitution to the top and dominant national agenda aggravate the problem. To meet its challenges, agriculture needs new ways of managing food security that encourage innovation and respond to global pressures. Ensuring food security for the state is a key component of its national security and sustainable socio-economic development. As a socio-economic category, "food security is considered within the system of social, economic, organizational, environmental, and other factors that accelerate or inhibit the development of the agro-industrial complex and the purchasing power of the population" (Voronina, 2022).

To summarize the above, it should be noted that, in addition to the main elements of the organizational and economic mechanism for ensuring food security discussed above, it includes three subsystems:

1) food production, where the agro-industrial complex and agriculture are key sectors, requiring the development and implementation of economic regulation methods;

2) ensuring food safety during production, storage, and transportation, forming the technological aspect of food security;

3) tools and methods for ensuring food availability to the population, forming the infrastructural aspect of food security.

The key systemic mechanism for ensuring the sustainability of food systems in megacities is long-term strategic planning based on a comprehensive consideration of environmental, climatic and economic factors. Strategic planning allows minimizing potential damage through the implementation of policies aimed at managing food security risk factors.

6.Conclusion

In modern conditions, ensuring food security of megacities requires the implementation of a

rational and balanced state policy aimed at achieving a high degree of sustainability of food systems. Policy in the field of ensuring food security should be based on the principles of efficiency and cost-effectiveness, that is, the stability of the functioning of food supply systems should be achieved without allowing excessive spending of budget resources. The optimal balance between the sustainability of food infrastructure and reasonable distribution of financial resources allows avoiding ineffective costs and creating conditions for long-term food stability. Identification and prioritization of food security risks allow directing resources to minimize the most significant threats, which, in turn, helps to increase the effectiveness of management decisions. Integration of food security mechanisms with the risk management system underlies the formation of a balanced food policy capable of adapting to changing external and internal conditions without excessive burden on the budgetary and financial system of megacities.

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