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GLOBAL FOOD SECURITY CHALLENGES AND MODERN APPROACHES TO ENSURING SUSTAINABLE FOOD SYSTEMS

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Abstract.
This article examines contemporary global food security challenges and analyzes the socio-economic, environmental, and institutional factors affecting sustainable food systems. The research highlights the impact of rapid population growth, climate change, inefficient distribution systems, agricultural intensification, and geopolitical instability on global food security. Special attention is paid to the role of agriculture, innovative technologies, and state policies in ensuring food sustainability. Furthermore, the paper discusses the reforms implemented in Uzbekistan to strengthen national food security and improve agricultural productivity. Scientific conclusions and practical recommendations for improving food supply systems and reducing food losses are proposed.

Keywords:
food security, sustainable agriculture, food systems, climate change, agricultural policy, food supply, food waste, agribusiness, nutrition security.

INTRODUCTION. Food security has become one of the most pressing global issues of the 21st century due to the rapid growth of the world population, climate change, depletion of natural resources, and instability in global supply chains. According to international organizations, ensuring stable access to safe, nutritious, and affordable food remains a strategic priority for both developed and developing countries.

The concept of food security extends beyond mere food availability. It also includes accessibility, utilization, nutritional quality, and sustainability of food systems. Today, despite significant technological progress in agriculture and food production, millions of people continue to suffer from hunger and malnutrition, while another part of the population faces obesity and nutrition-related diseases.

The importance of food security has increased especially after global crises such as the COVID-19 pandemic, regional military conflicts, rising inflation, and environmental degradation. These factors have demonstrated the vulnerability of global food systems and the necessity of developing resilient agricultural policies.

LITERATURE REVIEW. Scientific approaches to food security differ according to economic, social, and institutional perspectives. The Food and Agriculture Organization (FAO) defines food security as a condition in which all people, at all times, have physical and economic access to sufficient, safe, and nutritious food necessary for an active and healthy life.

According to E.V. Serova, food security reflects the level of providing the population with essential food products necessary for maintaining normal living conditions.

Balabanov and Borisenko interpret food security as the guaranteed satisfaction of national food demand through domestic production and reserve systems while ensuring food quality and safety standards.

Modern researchers emphasize that food security is closely connected with sustainable agricultural development, efficient resource management, and digital transformation in agriculture. Technological innovations such as precision farming, smart irrigation systems, biotechnology, and digital monitoring platforms are increasingly considered essential tools for ensuring future food sustainability.

RESEARCH ANALYSIS AND DISCUSSION

Global Food Security Problems

One of the major threats to food security is the rapid growth of the world population. According to demographic forecasts, the global population may exceed 9 billion by 2050, significantly increasing demand for food products.

At the same time, climate change negatively affects agricultural productivity. Rising temperatures, droughts, floods, desertification, and water shortages reduce crop yields and threaten livestock production. Developing countries are especially vulnerable because their economies heavily depend on agriculture.

Another important issue is food waste. Approximately one-third of all food produced globally is lost or wasted annually. This demonstrates inefficiencies in production, transportation, storage, and consumption systems. Reducing food losses could substantially improve global food availability without increasing production volumes.

Environmental Consequences of Intensive Agriculture

Modern intensive agricultural practices have increased productivity but also created serious environmental problems. Excessive use of chemical fertilizers, pesticides, and antibiotics negatively affects soil fertility, biodiversity, water quality, and human health.

Livestock production contributes significantly to greenhouse gas emissions and deforestation. In particular, uncontrolled expansion of pasture lands leads to ecological degradation in tropical forest regions.

The fishing industry also faces serious sustainability challenges due to overfishing and marine ecosystem destruction. If these trends continue, seafood shortages may become one of the future food security threats.

Socio-Economic Factors

Food insecurity is strongly connected with poverty, unemployment, income inequality, and political instability. In many developing countries, food shortages are not caused by insufficient production alone, but also by weak logistics systems, limited purchasing power, and poor governance.

Furthermore, geopolitical conflicts and trade restrictions can disrupt global food supply chains, leading to rising food prices and shortages in vulnerable regions.

FOOD SECURITY POLICIES IN UZBEKISTAN

Ensuring food security has become one of the strategic priorities of socio-economic reforms in Uzbekistan. Large-scale reforms aimed at modernizing agriculture, supporting farmers, improving irrigation systems, and increasing food production capacity are being implemented.

The President of the Republic of Uzbekistan, Shavkat Mirziyoyev, has repeatedly emphasized the importance of agricultural reforms and food security in national development strategies.

Particular attention is being paid to:

- diversification of agricultural production;
- development of multi-sector farms;
- support for agribusiness and family entrepreneurship;
- introduction of innovative technologies;

- improvement of storage and logistics infrastructure;
- enhancement of export potential.

These reforms contribute to increasing rural employment, improving living standards, and strengthening national food independence.

CONCLUSION

Food security remains one of the most complex and strategically important global challenges. Population growth, climate change, environmental degradation, inefficient food distribution, and socio-economic instability continue to threaten sustainable food systems worldwide.

Ensuring food security requires integrated approaches involving sustainable agricultural development, technological innovation, environmental protection, efficient state regulation, and international cooperation.

For Uzbekistan, strengthening food security should remain closely connected with agricultural modernization, digital transformation, support for farmers, and rational use of natural resources. Sustainable development of agriculture and effective food policies will play a decisive role in improving the well-being and quality of life of the population.

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