

# Ecological and Food Security in the Conditions of the Geopolitical Situation in the Worldglobal Digital Transformation Trends in Real Sectors of the Economy

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**Abstract.** The article is devoted to the study of conceptual issues of ensuring food and environmental security at the global level. In modern conditions, the problems of environmental and food security and its provision are becoming one of the most important issues and are of particular relevance. World population growth rates that are faster than the rate of food and agricultural production, as well as declining trends in the resources used to produce staple foods, further exacerbate the problem. The risks and threats to environmental security, which are directly related to food security issues, are analyzed. Factors hindering the development of food security have been identified. The strategic directions for the development of food and environmental security in the context of global transformation and their contribution to maintaining sustainable food self-sufficiency of the state are determined. The study showed that environmental and food security is politically and economically manipulated by state interests, which leads to an urgent need for reforms to ensure an innovative way of development and functioning of countries in order to reduce their dependence on external economic markets.

## 1 Introduction

The problems of healthy and rational nutrition, maintaining high quality food products, their physical and economic accessibility, the fight against hunger and malnutrition, the need to ensure a highly effective food security system at the global level, the organization of an optimal structure and principles for the functioning of world food markets and markets for agricultural raw materials have been and remain priority for the entire modern

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world community. It is shown that the general goals of economic policy - food security and environmental security - contradict each other to a certain extent. On the one hand, without environmental security it is impossible to fully realize the goal of food security. Indicators for assessing food security or lack of it should include indicators that reflect the risks of achieving the goals, in particular agro-environmental risks in the areas of “stability” and “food use”.

At present, due to objective reasons (population growth, depletion of resources, environmental degradation, imperfect organization of food markets, uneven distribution of agricultural resources, etc.), the tasks in the field of improving and achieving food security, both at the national and global levels have acquired an extraordinary role, and their solution requires the efforts of all developed and developing countries of the world. All this proves the relevance and prospective significance of this subject of research, which determined the structure and logic of scientific research.

Ensuring food and environmental security is one of the fundamental tasks of the state and society. The solution of such a global and complex task is impossible without the development of national projects for the development of conglomerates of industry and science, as well as for the conservation of food resources for future generations [1].

The global economic crisis is raging in the world. The food shortage situation is becoming critical for many countries.

In addition, the impact on the economy has increased, especially through commodity price shocks that slow economic growth and raise the cost of living to critical levels for hundreds of millions of people, especially the poor who are unable to feed their families. The situation is only getting worse.

The world today is more complex and unstable than it was five years ago. Hunger is on the rise: 270 million people are severely food insecure and the world continues to bear the brunt of malnutrition. New wars and unresolved conflicts, the global climate crisis and recurring economic shocks, including those caused by the COVID-19 pandemic, are adding to the negative momentum.

The challenge for the World Food Program (WFP) is to help the world overcome the challenging circumstances that are moving it not closer to ending hunger, but further away from it.

Structural vulnerabilities, such as resource scarcity in key development areas and unsustainable food systems, exacerbate the effects of shocks and stressors and are major obstacles to reversing this trend. The situation is further complicated by organizational disunity, lack of rights of the population and other limiting factors that slow down work. In addition, the costly response to the COVID-19 pandemic is eroding resources that can be used to scale up care and support to those who receive the least attention. But all is not lost: in addition to the opportunities offered by WFP’s global presence, its potential and reach into the world’s most volatile regions, there are promising innovation trends that can be leveraged to increase impact.

## **2 Research Methodology**

The purpose of the study is to substantiate national prospects for solving global problems associated with the global shortage of high-quality agricultural raw materials and food, as well as strengthening environmental and food security throughout the world.

The object of the study is the system of food and environmental security of the state. The subject of the study is the system of economic and organizational relations, which is formed in the process of functioning and development of the food security system of the state in the context of globalization.

In the process of work, descriptive techniques, methods of generalization, comparison, analysis, systematization and argumentation were used.

In scientific work, in particular, historical and economic methods are used (to study the emergence of the concept and significance of food and environmental problems), computational and constructive methods (to solve the problem of global food security), observation (for a systematic and purposeful study of measures aimed at ensuring food and environmental security in a collaborative and coordinated global effort), typology (for studying international food security, for solving world food problems, international strategies for ensuring food and environmental security in the context of the system) and a number of general scientific methods, such as analytical and evaluative [2].

World food security has always been the subject of study by domestic and foreign scientists. The theoretical basis for the problem of the prospects for the development of food security and its risks in the global world economy was the research of such leading scientists and economists - practitioners as: Altukhov A.I., Kuzyk B.N., Petrenko E.S., Chemezov S.M., Myakinnikova N.A., Melnikov B.A., Trubilin I.T., Castro J., Hockmann H., Rocca M., Sherpa M., etc. The analysis was carried out on the basis of various statistical data, including foreign ones (UN World Food Program, Bloomberg, Thomson Reuters), laws of the Russian Federation; Decrees of the President and the Government of the Russian Federation.

### **3 Results and Discussions**

Recently, geopolitics has sharpened the debate around the most sensitive and painful topic - food security. It should be noted that the crisis is a real fact and arose long before the latest geopolitical events, and that the problem is not a reduction in food supplies, but an increase in the number of people who will not be able to afford food due to a sharp increase in prices [3].

Since 2014, there has been an increase in chronic hunger. In 2019, the number of chronically hungry people in the world was 650 million, which is 43 million more than in 2014. In 2020, the situation worsened sharply: up to 811 million people were recognized as chronically hungry, 161 million more than in 2019. According to the latest forecasts, in 2030 the number of chronically hungry people will be about 660 million, which is 30 million more than it would be without the COVID-19 pandemic.

For 2021, the number of people in need of urgent food assistance in countries is estimated at about 270 million people [4]. Globally, there are 41 million people living in emergency-level acute hunger and more than half a million who are assessed as famine-like. In addition, the global burden of malnutrition remains significant: an estimated 150 million children are stunted, 50 million are wasted, one in two children and two billion adults are malnourished.

The United Nations (UN) estimates that one in ten people on the planet could not eat well last year. That is, either he was starving or malnourished. This year, the situation has worsened further: economic sanctions have been imposed on the difficulties caused by the coronavirus. The food price index hit a record high. The Food and Agriculture Organization of the United Nations (FAO) states that over the two pandemic years, the number of people who suffer from hunger has increased by about 200 million people. In total, about 900 to 950 million people suffer from food shortages, with many children who are constantly malnourished (Somalia (59%), Yemen (45.1%), Central African Republic (43%), Chad (39.6%), Democratic Republic of the Congo (39%)).

The problems did not start in 2022, the world faced a shock to the food market as early as 2020. Businesses closed, labor migration stopped. The usual supply chains were disrupted. All this led to the fact that the supply on the world food market was reduced [5]

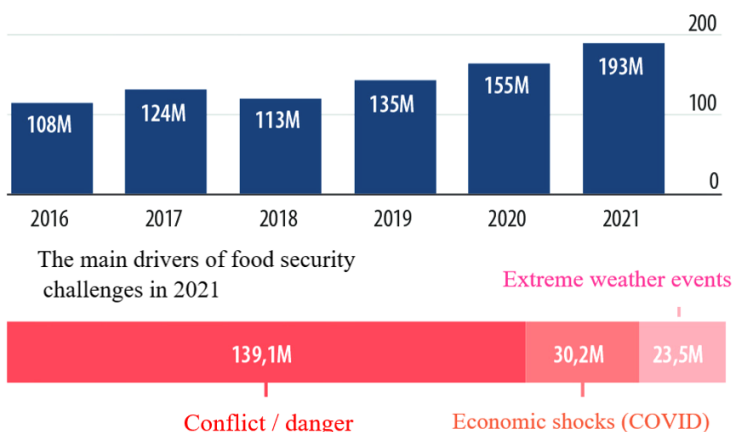
The food crisis is already a fact. It began at the height of the pandemic, when many traditional supply chains were broken. The decline in food supply was accompanied by an aggressive speculative game to increase prices. The situation worsened in the summer of 2021, when, after an unreasonable reduction in forecasts for the Russian harvest, grain prices soared to \$300 and then only grew. This undermined the budgets of grain-importing countries, which were unlikely to count on such a sharp surge in prices.

And if in the “pre-Covid” year there were about 690 million hungry people on the planet, if the planet’s population is slowly approaching 8 billion people, then every twelfth person in the world, mainly in developing, poor countries, constantly experienced hunger.

The pandemic has sharply increased the scale of hunger, adding about 110-120 million more people to the number of hungry people. In 2021, their total number was 820 million people. If in 2015 humanity set the goal of eliminating hunger completely by 2030, then we see that, unfortunately, this goal once again remains unattainable (Fig. 1).

It can be seen that up to February 2022, 193 million people in 53 countries were already experiencing severe food insecurity.

The first alarming situations that the goals of sustainable development, including ensuring food security in the world, are under threat of implementation, appeared in 2019. That is, it was clear that it would not be possible to completely eliminate hunger by 2030. And then a pandemic happened, which aggravated these processes, and since May 2020 we have been seeing a rapid increase in prices for all commodities (commodities), including food [5].



**Fig.1** Dynamics of the number of people around the world experiencing acute problems with food security, million people (Source: UN World Food Program). The events of 2022 have further complicated the global food supply problem. Current political events have brought global food security to the brink of disaster

Africa is the region of greatest risk, almost 40% of imports. All African grain comes from Russia and Ukraine. In Eritrea it is 100%. In Somalia over 90% and in the Democratic Republic of the Congo over 80%.

The price of bread has almost doubled in Sudan and increased by 70% in Lebanon. Meanwhile, price volatility is already spreading in the soybean, corn and rice markets.

The global number of undernourished will increase by 13.1 million in the short term (2022/23), with 6.4 million in Asia and the Pacific and 5.1 million in sub-Saharan Africa.

In the face of crises like the current one, some countries are very vulnerable to dependency on imported food (and fertilizers) as a result of various phenomena. Already in the colonial era, a change in the traditional diet began with the introduction of crops of

wheat, rice and corn. They are then transferred through international aid even to countries where they cannot be grown [6].

At the same time, even where these crops were used, profitable crops took over. In Africa, the transition began with a structural adjustment program in the 1980s. But the trend is widespread.

For example, tobacco cultivation is believed to have been replaced by vegetables and legumes in Bangladesh, and cassava, millet and sweet potatoes in several African countries.

On the other hand, the development of high-yielding wheat varieties during the Green Revolution led to the replacement of legumes and rice with wheat monocultures.

Inflation exceeds expectations and goes beyond food and fuel prices. This forced major central banks to announce further monetary tightening, which is necessary but will delay the economic recovery [7]. Continued disruptions due to the pandemic, especially in China, and new delays in global supply chains are holding back economic activity.

Although formally food is exempt from sanctions, in fact there is an almost complete naval and air blockade of Russia, whose role in the global food market is now very large. That is, you can sell something, but you still have to manage to deliver food to where it is needed. Plus, there were problems with interstate payments.

The global food price growth index reached its highest level since 1990. The record was set by prices for wheat, corn, vegetable oil. More than 30% of grain production, more than 20% of corn production and more than 50% of vegetable oil production are in Russia and Ukraine [8]

Accordingly, this global environment has led to a significant reduction in supply in the world market and an increase in prices [9]. Rising prices are observed not only in countries with weak economies, but also in Europe and the United States. Inflation in the US has already reached 10%, the situation is the same in some EU countries (the average for the euro area is 7.5%). Some countries during the pandemic have introduced accelerated purchases of food in state reserves (China).

In the 2021/22 season Ukraine produced 86 million tons of grain. As of June 3, 2022, more than 47 million tons were exported, i.e. 55% of the total production, of which 18.5 million tons of wheat, 5.7 million tons of barley and 22.4 million tons of corn, with domestic consumption of 10, 5 million, 3.8 million and 11 million tons, respectively. This means that there are about 14 million tons of reserves left, of which, if something can be taken out, it is only corn [10].

Grain from Ukraine is transported to warehouses in Europe instead of Africa and the Middle East, where it was originally supposed to be delivered. More than 50 countries of the world depend on supplies from Ukraine and Russia.

The global crisis in the fertilizer market means that now, more than ever, the countries of the world need to provide for themselves. As the rapid rise in prices in the UK and the US shows, even countries in the developed world are not immune to global impacts. But in many countries that were already teetering on the brink of instability, the situation became simply desperate. In Sri Lanka, where annual inflation has now reached 54%, more than 80% of the population goes hungry. Hunger in the Sahel has reached record levels. For humanitarian organizations, the consequences are also negative. Record high food prices and skyrocketing transportation costs as rich countries try to find energy sources other than Russia are a deadly combination for 274 million people who will need humanitarian aid this year. And this is just the beginning. The global food crises of 2008 and 2012 showed that food shortages exacerbate existing problems and, in the worst cases, spark new conflicts.

The worsening crises in various parts of the world have been caused by a combination of geopolitical, economic and natural causes, such as extreme heat, floods and droughts caused by climate change. This crisis continues the food security and economic crises that began during the COVID-19 pandemic.

The situation on the global food market has worsened since the start of the pandemic, which disrupted supply chains, which, in turn, led to a significant increase in the cost of logistics services, including food transportation. Along with logistics, prices for energy resources, mineral fertilizers and other means of production have increased.

The rise in food prices and the deterioration in the dramatic situation in which large segments of the world's population find themselves as a result of this situation are exacerbated by the well-known and never corrected distortions of food systems. The same anomalies constantly threaten global food security, understood as access to food [8].

These and other factors predetermine the need to form the main factors for ensuring the food problem. With their help, it will be possible to determine the needs of mankind in food and satisfy them in the right amount.

The main factors hindering food security include:

1. conflicts;
2. climate crisis;
3. slowdown in economic growth.

In this regard, the governments of many countries have begun to introduce restrictive barriers to the export of food and raw materials for its production, to create safety stocks, and so on. Speculative market participants became more active. These circumstances provoked an imbalance of supply and demand in the world food market, which was accompanied by a global rise in prices and food shortages in some countries.

Fertilizer prices are now skyrocketing and shortages are looming. Russia, Ukraine, China and Kyrgyzstan have imposed restrictions on the export of fertilizers. Russia and Belarus together produce 40% of the world's potash fertilizers; in 2021, Russia was also the leading exporter of ammonium nitrate (49% of global export markets) and NPK products (38%), ammonia (30%) and urea (18%).

Greenpeace called on the European Union (EU) to switch production of feed crops for intensive farming to food crops for human consumption, arguing that only 8% of the EU's feed crops will be used to compensate for the loss of grain imports from Ukraine and guarantee access to food for the country's poorest residents. It is expected that the transition to organic farming on 25% of the land - as required by the EU "From Farm to Table" - will allow Europe to sharply reduce imports of nitrogen fertilizers and thereby reduce exposure to the risk of rising prices and shortages [9].

Another structural weakness that the current crisis has exposed is that hundreds of millions of people do not have the income or resources to adjust to the new conditions. More than 50% of farmers live below the poverty line in several southern countries with the largest rural populations. The poorest people in low-income countries spend more than 60% of their income on food. Under these conditions, even a small increase in prices can have devastating effects, vulnerabilities that have been ruthlessly exposed by the Covid-19 pandemic.

It is obvious that in the new season Ukraine will actually leave the international food arena. Russia, in turn, will also have to change logistics routes and switch to other sales markets, which may take some time. And if we add to this the drought in India and France, then we can assume what the world food balance and prices will be like in the new season.

Russian agricultural producers, adapting to rapidly changing conditions, are looking for alternative ways of supply and mutual settlements, in particular, by opening accounts in another currency, for example, in Chinese yuan.

Thus, import-dependent countries are also heavily indebted. This creates a vicious cycle in which the need for liquidity to pay off debts and import food hinders any better investment in the future.

## 4 Conclusions



The global transformation of the world economy has begun. Moreover, the coronavirus pandemic also had serious inflationary processes, which primarily affected the cost of food products. In this regard, it is relevant to take relevant and more effective measures that are able to effectively respond to systemic processes that have their source in global crisis processes.

Russia remains a reliable player in the global food market, which will fulfill all international obligations under all export contracts, no matter how difficult it may be.

In general, the world produces enough food to feed the entire population of the planet, regardless of the price of energy, fertilizer, chemicals, wars and conflicts. If food were consumed rationally, if it were preserved, protected, transported freely, then the problem of hunger as such on a planetary scale could be solved within a few years.

The main causes of food security are conflicts, the climate crisis and economic shocks, which provide opportunities for the implementation of new measures to overcome the unstable situation:

1. expanding capacity to meet urgent food and nutrition needs;
2. improving nutrition, health and education;
3. improving the quality and sustainability of livelihoods;
4. improving the efficiency of national programs and systems;
5. Improving the efficiency and effectiveness of humanitarian organizations and development actors.

Multilateral bodies like the World Trade Organization should encourage the economically largest countries to coordinate and open food reserves in order to prevent further price increases. In addition, governments can respond to the food price crisis by delivering humanitarian aid to the most vulnerable countries and increasing funding for humanitarian organizations that are struggling to cope with rapidly rising procurement and transportation costs.

However, humanitarian aid alone will not be enough if we are to prevent the food price crisis from escalating into a physical food insecurity crisis. We need to promote self-sufficiency, including by helping developing countries diversify import sources and adopt new genome-editing technologies to improve crop yields. It is also necessary to help African countries to increase the production of fertilizers. Many countries, including Mozambique, Togo, Tunisia and Nigeria, have significant untapped reserves of raw materials needed to produce their own fertilizers and reduce Africa's dependence on Russian supplies.

Finally, the current crisis highlights the importance of improving trade coordination. For example, the recently created African Continental Free Trade Area promises to help expand intra-regional trade and provide some protection against future external shocks.

In conclusion, recommendations can be made to overcome the emergency and start transforming the food system:

1. provide financial assistance and debt relief to vulnerable countries;
2. suppress speculation in commodities, including by imposing a tax on indexed funds for these commodities;
3. create regional grain stocks and a global food aid apparatus fit for protracted crises;
4. diversify food production and trade systems. Transition to more sustainable crops adapted to local conditions;
5. Rebuild resilience and reduce harmful dependencies through diversity and agroecology, overcoming the dominance of industrial agriculture, which has once again failed in the face of the crisis.

Increasing underlying drivers of food and environmental insecurity, malnutrition (conflicts, extreme weather events, economic shocks), high food costs and growing inequality will continue to challenge food and environmental security. Only transforming

the agri-food system in a sustainable and inclusive manner, strengthening its resilience and making it a source of cheaper, more nutritious and affordable healthy food for all, will reverse this trend.

The practical significance of the results of the scientific work lies in the fact that the proposed research can be applied as part of the process of updating state policy in the field of ensuring food and environmental security at the macro and meso levels of management.

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