

Research Paper

The Development of the World Economy and the Impact of the Global Food Crisis 2022-2023

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ABSTRACT

Purpose: The aim of to substantiate the theoretical and applied foundations for identifying the impact of the global food crisis of 2022-2023 on the development of the world economy. **Design/methodology/approach:** The methodological basis of the study consists of fundamental methods of economic analysis and basic research, namely: synthesis, system analysis, comparison, analogy, graphical, tabular, generalization, systematization, grouping, k-means clustering, correlation, and regression analysis. **Findings:** As a result of the research, it was found that in 2022, the destabilizing impact of the global food crisis on the development of the world economy has increased. This led to a sharp rise in food prices, increased inflationary factors, and deepening poverty. **Research, Practical & Social implications:** A set of measures to counteract global and local destabilizing factors was proposed to overcome the crisis. **Originality/value:** The downward trends in the development of the world economy and its inability to effectively counter the challenges and dangers of our time have been revealed.

HIGHLIGHTS

- To substantiate the theoretical and applied foundations for identifying the impact of the global food crisis of 2022-2023 on the development of the world economy. The downward trends in the development of the world economy and its inability to effectively counter the challenges and dangers of our time have been revealed.

Keywords: Food security, globalization, world economy, economic development, food, the threat of famine, food crisis

At the present stage, the development of the world economy is influenced by significant destabilizing factors of global nature. Furthermore, it affects the trends in the development of each country's economy significantly. Additionally, there is an ongoing global integration of individual national economies into one single global economic system. This particular process transforms the mechanisms of interstate regulation of the world economy and combines the interests of highly developed countries

with the interests of developing countries. Ensuring sustainable development of the entire global system and social balance requires balanced decisions of the entire world community, notably in the period of aggravation of socio-political and financial-economic crises. Evidently, under the significant

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destabilizing influence of global instability, which is aggravated by the armed military conflict and Russia's aggression against Ukraine, the issue of global food security and the escalation of the global food crisis has become urgent. It is caused by Russia's theft of grain from the territories of Zaporizhzhia, Donetsk, Luhansk, and Kherson regions, temporarily occupied by the aggressor country. Further reasons are the destruction of agricultural infrastructure due to active hostilities, the blocking of Ukrainian seaports, and their mining. Considering the outlined trends, the chosen research issues are actualized, and the factors of the global food crisis's impact on the development of the world economy require in-depth study.

Literature Review

Problematic aspects of the study of the impact of the global food crisis of 2022-2023 on the development of the world economy have been the focus of attention of the international community for a long time. However, they became especially relevant during the escalation of the military conflict in Eastern Europe. Russia's war in Ukraine only intensified the processes of the global food crisis but did not cause them. Rother *et al.* (2022) are inclined to believe that food insecurity has been worsening over the past five years, and low-income countries are most negatively affected. Food security problems have existed for a long time, as the rise in wheat and corn prices by 40-50% was first recorded in the pre-war period. They were repeatedly raised in the Global Report on Food Crises 2022: Joint Analysis for Better Decisions, 2022. They emphasize the spread of hunger and rising food prices and note that achieving Sustainable Development Goals depends on overcoming hunger and ensuring optimal food security. Moreover, the fight against global famine, counteracting the food crisis, and ensuring food security at the supranational level are one of the priorities of Sustainable Development Goals proclaimed by the UN General Assembly in 2015 (United Nations General Assembly, 2015).

Hobela *et al.* (2022) call the COVID-19 pandemic and the aggravation of the global economic crisis the causes of the worsening food crisis in the world. At the same time, Roszell (2021) adds to the list of causes of the increasing impact of socioeconomic factors that manifest their destabilizing effect through rising unemployment and deepening poverty. At the same time, Roszell (2021) insists that the global food crisis will continue to intensify in the coming years against

the backdrop of the deepening global financial and economic crisis, and the most challenging year in terms of the food supply is projected for 2023. At the same time, scientists suggest assessing the level of food security based on the calculation of the Global Food Security Index.

A similar position is held by Carthy *et al.* (2018), who argue that the food crisis cannot be limited by geographical boundaries but is becoming global. At the same time, scientists are convinced of the relationship between food security and food shortages on a global scale. Moreover, Wan *et al.* (2021) found that the global food crisis, in addition to all of the above, is due to decreased acreage and agricultural land. As a result, the main emphasis is shifted to the food supply, and the issue of the nutritional quality of food is leveled under the influence of existing problems. Under such conditions, the problem of ensuring environmental sustainability in the context of food security from the strategic perspective is becoming more relevant. According to Wang *et al.*, (2021), this is consistent with sustainable development and requires increased attention. The study of the global food crisis should be conducted through the prism of sustainable development of the world economy.

At the same time, significant attention should be paid to the intensification of the global food crisis in countries with significant volumes of food imports, particularly African and Asian countries with high populations. In this context, Bai *et al.* (2020), suggest that under the current conditions, the international trade system in agricultural products and the improvement of its supply chains need to be reformatted. According to Ma *et al.* (2021), these chains have undergone significant disruptive changes due to the spread of the COVID-19 pandemic and exacerbated by the challenges of Russia's war against Ukraine.

Béné *et al.* (2021) argue that the adverse effects of global instability have been reflected in the deepening of the food crisis. Consequently, the level of food security on a global scale has decreased, and the principles of financial and physical access to food have been violated. National food systems have adapted as much as possible to the crisis conditions but have not been able to ensure adequate resilience to challenges and hazards. Raymond *et al.*, (2021) argue that systemic risks play an ambiguous role. They have a significant impact on the food systems of countries around the world, among the most important of which are: (1) instability of food systems caused by globalization; (2) changes in climatic conditions and

their consequences for the agro-industrial complex; (3) negative impact of food production on the ecosystem; (4) global demographic changes in terms of population, urbanization, and diet.

At the same time, King *et al.* (2017) suggest that in the comparative strategic perspective, global megatrends in the field of food security at the international level will create new problems that will further deepen the global food crisis, as it will be a daunting task for most countries to overcome destabilizing factors quickly. To reduce the destabilizing impact of negative factors, Mok *et al.* (2020) suggest applying innovative methods of doing business today and attracting innovations to the agro-industrial complexes of all world countries.

Undoubtedly, the issue of studying the impact of the global food crisis on the development of the world economy is relevant, requiring further study and in-depth research.

The study aims to substantiate the theoretical and applied foundations for identifying the impact of the global food crisis of 2022-2023 on the development of the world economy.

MATERIALS AND METHODS

The methodological basis of the study consists of the core methods of economic analysis and fundamental research. The synthesis and system analysis method has been used to determine the essence of the global food crisis. The study of the impact of the global food crisis on the development of the world economy has been held using the method of comparison and analogy. A visual display of the study's results has been carried out using graphical and tabular methods. The formation of conclusions and results of the study has been performed based on methods of generalization and systematization. The grouping of individual European countries by the Global Food Security Index and the Global Sustainable Development Index in 2020-2022 to identify standard features of development has been conducted using the technology of k-means clustering. Identification of the impact of food security indicators on the sustainable development of the world economy has been carried out using the method of correlation and regression analysis.

The study involved European countries with different levels of economic development: highly developed (Austria, Denmark, Ireland, Netherlands, Germany, Finland, France, Sweden, Switzerland, Norway, Great Britain, Belgium, Spain, Italy, Poland, and Portugal) and developing countries (Greece, Romania, Hungary,

Belarus, Russia, Bulgaria, Czech Republic, Slovakia, Serbia, and Ukraine).

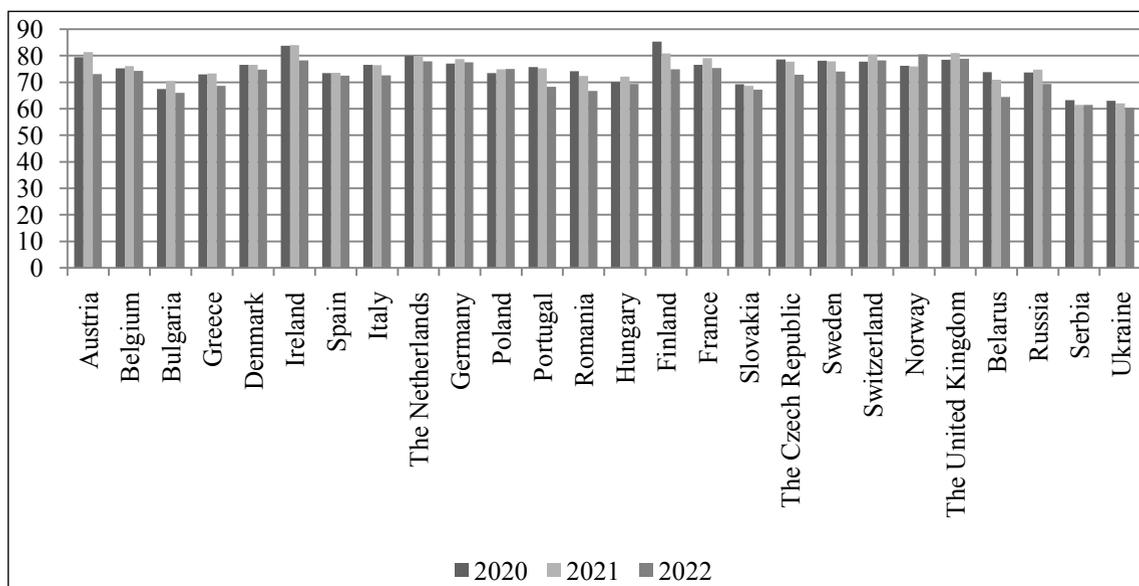
The information base of the study is the reporting data of international organizations for 2020-2022: Sustainable Development Report by the Global Sustainable Development Index; Global Food Security Index 2020: Addressing structural inequalities to build a strong and sustainable food system, Global Food Security Index 2021. Rankings and Trends, Global Food Security Q2 2022. Food Security Index 2022 by the Global Food Security Index.

RESULTS

In the context of global instability, uncertainty, and growing danger from destabilizing factors of a military nature, the problem of studying the impact of the global food crisis of 2022-2023 on the development of the world economy is becoming more urgent. Its growth rates have significantly decreased, and the living standards of the population in the countries of the world are recording downward trends. Under such circumstances, the issue of intensification of the global food crisis, which has reached a critical level and threatens to spread global hunger, has become critical. Russia's war in Ukraine has significantly deepened the negative trends of the current state of the global food system and caused a violation of the guarantee obligations to ensure food security.

The study of the Global Food Security Index in European countries in 2020-2022 (Fig. 1) made it possible to establish the ambiguity of the situation regarding the problems of global food security. The European countries were assessed by the Global Food Security Index, which includes the level of access to food, its quality and safety, environmental friendliness of production, and constant access for the population. It became known that highly developed countries can more effectively withstand challenges, threats, risks, and hazards in food security. This is confirmed by the values of the Global Food Security Index, which are pretty high in these countries; in particular, in Ireland GFSI is 78-84, in Finland – 75-85, in the Netherlands – 78-80, and the UK – 79-81. Accordingly, the global food crisis in such countries is less tangible.

At the same time, transitional countries, which continue their development and have not completed the transformation process, are more affected by the global food crisis. National food systems in them cannot adequately withstand the latest risks and threats to the food supply. The value of the Global



Calculated based on: Global Food Security Index 2020: Addressing structural inequalities to build strong and sustainable food system; Global Food Security Index 2021. Rankings and Trends; Global Food Security Q 2 2022. Food Security Index 2022.

Fig. 1: Dynamics of the Global Food Security Index in Europe in 2020-2022

Food Security Index in such countries is much lower and occasionally even critical: in Ukraine, GFSI is 60-63, in Serbia – 61-63, in Slovakia – 67-69, and in Bulgaria – 66-71.

It is worth noting that in 2022 there was a sharp decline in the Global Food Security Index in all countries of the analyzed cereals except Norway. Firstly, this proves the significance of the impact of the armed conflict in Eastern Europe and confirms that the countries participating in the conflict still have a significant impact on the global agricultural market. Secondly, Russia’s full-scale military invasion of Ukraine threatens global food security and provokes the largest food crisis in human history. The consequences of this situation are manifested in the rising cost of food. In addition, the energy crisis, caused by the large-scale destruction of the energy system of Ukraine as a result of active hostilities and missile attacks, further exacerbates the existing negative trends and deepens the poverty and impoverishment of the population. According to the United Nations, these figures reached 71 million people in 2022 (United Nations Development Program. Global cost-of-living crisis catalyzed by war in Ukraine sending tens of millions into poverty, warns UN Development Programme, 2022).

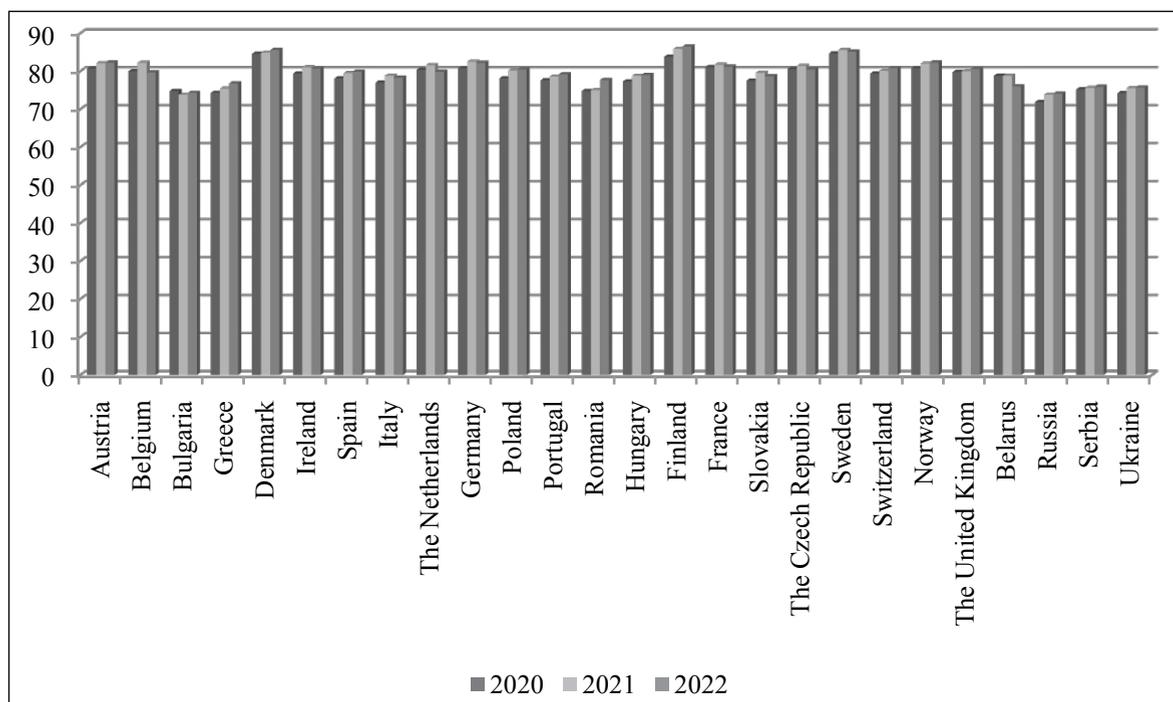
It is evident that the global food crisis, aggravated by the energy crisis, has led to a significant

slowdown in the global economy, and the impact of inflationary factors has reached record levels (inflation in 2022 is fixed at 9.4%, and in 2023 it is planned to be 6.4%). According to Alderman, the pace of global economic development will decline from 3.1% in 2022 to 2.2% in 2023, and forecast estimates for 2024 provide for a slight increase to only 2.7%.

Assessing the state of development of the world economy, it is worth examining the Global Sustainable Development Index trends. It comprehensively reflects the trends of changes in both the global and national economies, considering the mutual impact of social and environmental components. The study of the dynamics of the Global Sustainable Development Index in individual European countries in 2020-2022 (Fig. 2) reveals similar trends to those recorded concerning the Global Food Security Index: highly developed countries position higher indicators of sustainable development than developing countries.

Moreover, it is worth noting that in 2022, no significant changes in the decrease in the value of the Global Sustainable Development Index were recorded. It can be assumed that the current events will be reflected in the Global Sustainable Development Index in 2023.

For a more precise grouping of European countries in terms of food security and sustainable development



Calculated based on: Sustainable Development Report, 2020–2022.

Fig. 2: Dynamics of the Global Sustainable Development Index in selected European countries in 2020-2022

indicators and identification of standard features and peculiarities of their provision, we suggest using the technology of the k-means clustering method. The obtained results are systematized in Table 1.

As a result of the study, three groups were identified among the European countries selected for analysis: highly developed, middle-income, and developing countries.

The first group, according to the Global Food Security Index includes Austria, Denmark, Ireland, the Netherlands, Germany, Finland, France, the Czech Republic, Sweden, Switzerland, Norway, and the United Kingdom, where the risks and threats of the global food crisis are the least tangible. Food supply is provided at the expense of own reserves and capabilities.

The second group of countries is represented by Belgium, Greece, Spain, Italy, Poland, Portugal, Romania, Hungary, Belarus, and Russia, where there are some specific issues in the agro-industrial complex, and food needs are met by importing goods and food products. At the same time, the development of the agricultural sector of such countries requires modernization and the introduction of innovative production technologies.

Moreover, such countries as Belarus and Russia position themselves as exporters of raw materials for agricultural purposes. The sanctions imposed on them in response to the armed military aggression against Ukraine caused significant restrictions on their export activities. At the same time, it is worth noting that the level of food security in Russia in the conditions of war with Ukraine has not decreased. Moreover, the aggressor country managed to maintain its existing position by selling significant volumes of agricultural products stolen from Ukraine and moving to the territories controlled by Russia.

The third group includes Bulgaria, Slovakia, Serbia, and Ukraine, where the level of food security is quite low, which is caused by the peculiarities of the development of their national food markets and heavy dependence on highly developed countries. In addition, active hostilities taking place on the territory of Ukraine have limited the production and export of certain agricultural products from its territory, as significant crop areas have been destroyed, seaports have been blocked, and access to the territories temporarily occupied by the aggressor country has been restricted.

As for the grouping of countries according to the

Table 1: Grouping of European countries by the Global Food Security Index and the Global Sustainable Development Index in 2020-2022

Global Food Security Index			Global Sustainable Development Index			
No	Country	Cluster number	No	Country	Cluster number	
1	Austria	1	1.	Austria	1	
2	Denmark		2	Denmark		
3	Ireland		3	Germany		
4	The Netherlands		4	Finland		
5	Germany		5	Sweden		
6	Finland		6	Norway		
7	France		7	Belgium		2
8	The Czech Republic		8	Ireland		
9	Sweden		9	Spain		
10	Switzerland		10	Italy		
11	Norway		11	The Netherlands		
12	The United Kingdom		12	Poland		
13	Belgium	13.	Portugal			
14	Greece	14	Hungary			
15	Spain	15	France			
16	Italy	16	Slovakia			
17	Poland	2	17	The Czech Republic		
18	Portugal		18	Switzerland		
19	Romania		19	The United Kingdom		
20	Hungary		20	Belarus		
21	Belarus		21	Bulgaria	3	
22	Russia		22	Greece		
23	Bulgaria	23.	Romania			
24	Slovakia	24	Russia			
25	Serbia	25	Serbia			
26	Ukraine	26	Ukraine			

Calculated based on: Global Food Security Index 2020: Addressing structural inequalities to build strong and sustainable food system, Global Food Security Index 2021. Rankings and Trends, Global Food Security Q2 2022. Food Security Index 2022; Sustainable Development Report, 2020–2022.

Global Sustainable Development Index, the selected countries were distributed in the following group sequence: the first group - Austria, Denmark, Germany, Finland, Sweden, and Norway; the second group - Belgium, Ireland, Italy, the Netherlands, Poland, Portugal, Hungary, France, Slovakia, the Czech Republic, Spain, Switzerland, the United Kingdom, and Belarus; the third group - Bulgaria, Greece, Romania, Russia, Serbia, and Ukraine.

Obviously, the countries of the first group position much higher indicators of sustainable development and form the basic principles of world economic development. Instead, the countries of the second group record somewhat lower indicators of sustainable development and the value of indicators

of development of national economies, as they have specific problems that can be solved in the short term. The countries of the third group cannot ensure high indicators of sustainable development due to significant destabilizing factors of economic and social development. Such countries have not completed the transformation processes and need support from highly developed countries.

Thus, the results of our research allow us to state that the global food crisis, which became especially acute in 2022, has a significant impact on the development of the world economy and will continue to have a negative impact in 2023. To determine the degree of such impact, we propose establishing the relationship and interdependence

of the Global Food Security Index and the Global Sustainable Development Index. The necessary calculations were carried out using correlation and regression analysis (Statistica 8.0) by building a one-factor model, in which the Global Sustainable Development Index is considered to be the resultant indicator Y , and the factor indicator is – the Global Food Security Index.

Thus, the results of the correlation and regression analysis allow us to identify the strength of the relationship between the analyzed indicators, which is proven by the correlation coefficient $R = 0,874$ and the statistical significance of the model (F-test $F(8,9) = 3.220$) (eq. 1).

$$Y = 1,03 + 0,96 \dots(1)$$

$$R = 0,874; = 0,855; p < 0,5000.$$

where: Y – Global Sustainable Development Index;
– Global Food Security Index.

The growth of the food security index leads to the growth of the sustainable development index, as evidenced by the regression indicator $r = 0,96$.

Based on the results obtained, it can be argued that the global food crisis harms the development of the world economy and leads to a decrease in sustainable development indicators. It has been proven that the intensification of the global food crisis will be observed from a strategic perspective and will be especially noticeable in 2023. At the same time, it has been found that countries with a higher level of national economic development have a better potential to counter global food challenges and threats than developing countries. Given these trends, it is necessary to find effective ways out of the global food crisis and ensure sustainable development of the world economy.

DISCUSSION

The aggravation of the global food crisis has led to new risks and threats to human existence, one of which is the spread of famine. The figures announced by the UN that in 2022 71 million people crossed the poverty line show the global food system's crisis state, the world economy's inability to provide optimal indicators of global food security, and the need to find ways out of the crisis. The

existing problems of global food supply, aggravated by geopolitical instability and the emergence of armed conflicts in different parts of the world and Russia's full-scale war against Ukraine, do not contribute to a quick solution to the problematic issues; on the contrary, further deepening them.

In such circumstances, it is appropriate to outline the main problems caused by the global food crisis, which have the most significant impact on the development of the world economy, namely:—

1. violation of international principles of food security;
2. disruption of the leading food supply chains in different countries of the world;
3. the increasing shortage of food stocks, which has reached critical levels for some types;
4. the rapid growth of food prices;
5. changes in climatic conditions for growing and producing food;
6. inefficient use of land resources and inability to use them for their intended purpose;
7. limitation of the ability to fulfill export-import obligations;
8. violation of the principles of healthy competition in the global food market.

Undoubtedly, these problems cause aggravation of the global food crisis and the slowdown of the world economy, therefore requiring an immediate solution. It can be achieved through regulating existing conflicts, the cessation of active hostilities on the territory of Ukraine, using its raw material potential and land resources for their intended purpose, establishing supply chains, and ensuring their safe use.

CONCLUSION

Thus, the study of the theoretical and applied principles of identifying the impact of the global food crisis of 2022-2023 on the development of the world economy has made it possible to establish that the global food crisis has worsened in the current conditions, which intensifies the threat of global hunger. The downward trends in the development of the world economy and its inability to effectively counter the challenges and dangers of our time have been revealed. The cluster analysis

has proven that highly developed countries have greater, more significant opportunities to ensure food security than developing countries. A strong relationship between the growth of food security and sustainable development indicators has been established, as evidenced by the correlation coefficient $R = 0,874$ and regression coefficient $r = 0,96$. The significant problems of world economic development caused by the global food crisis have been identified, in particular: a sharp increase in inflation, rising food prices to critical levels, deepening poverty, and impoverishment of the population. A set of measures to counteract global and local destabilizing factors was proposed to overcome the crisis.

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