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THE IMPACT OF THE COVID-19 PANDEMIC ON GLOBAL FOOD SYSTEM RESILIENCE*

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The COVID-19 pandemic has brought significant challenges to food systems worldwide, exposing vulnerabilities in the global supply chains and threatening food security. The purpose of the research was to investigate the impact of COVID-19 on food system resilience globally. The study found that COVID-19 has disrupted global food systems through a combination of factors, including trade restrictions, supply chain disruptions, and reduced access to markets and labor. These changes have resulted in increased food insecurity, particularly for vulnerable populations, including low-income households and those living in countries heavily dependent on food imports. It was revealed that just after the outbreak of COVID-19, the prices of most agricultural products generally remained stable due to some economic factors. It was emphasized that some consequences of COVID-19 (e.g., high inflation rate) became apparent only when the majority of restrictive lockdown measures were lifted. The study concluded that addressing the impacts of COVID-19 on food security requires a multi-faceted approach that involves improving the resilience of food systems, investing in social protection programs, and ensuring equitable access to food for all populations.

Key words: *COVID-19, food system, resilience, food security, global supply chains.*

JEL Classification: *L60, L66*

Introduction. Food security is an important pillar of human existence and well-being. Globally, it promotes the development of the agricultural markets, has a positive impact on economic stability, and employment, and increases social resilience. Food security also contributes to the successful transition to sustainable development as one of the Sustainable Development Goals (SDGs) is dedicated to hunger and malnutrition. Although there have been some positive developments in overcoming hunger in recent decades, the issue of food security is still urgent. According to the Food and Agriculture Organization (FAO), in 2022, there were more than 800 million hungry people worldwide (this is around 10% of the global population) [1]. The problem of food security is becoming more relevant during periods of political, economic, and social instability. The latest shocks for global food security include the COVID-19 pandemic and the ongoing war in Ukraine. In our research, we will use the ex-post principle and concentrate on the COVID-19 pandemic. The COVID-19 pandemic has had a significant impact on the global food system, highlighting the importance of resilience in ensuring food security. It has caused a wide range of short- and long-term impacts on agriculture and the food supply, primary production, processing, trade, logistics (both domestic and international), and consumer demand. The proper reaction to such crises should be effective food system resilience – the ability to consistently ensure food security over an extended period, even in the face of instabilities [2]. This topic is of utmost importance as the world population continues to grow, climate change exacerbates food insecurity, and the demand for food increases.

Literature review. The literature review was conducted in two key steps: first of all, we analyzed publications using computer software Scopus Toolkit and VOSViewer and then provided a more detailed explanation of selected papers. Using Scopus Toolkit, we searched for a variety of publications on the topic «COVID-19 and food resilience». More than 1500 relevant peer-reviewed publications were found. Due to the high level of scientific novelty, the first paper on the topic was published only in the year 2020 when the World Health Organization (WHO) announced the pandemic. VOSViewer software allows to create a network map of keywords

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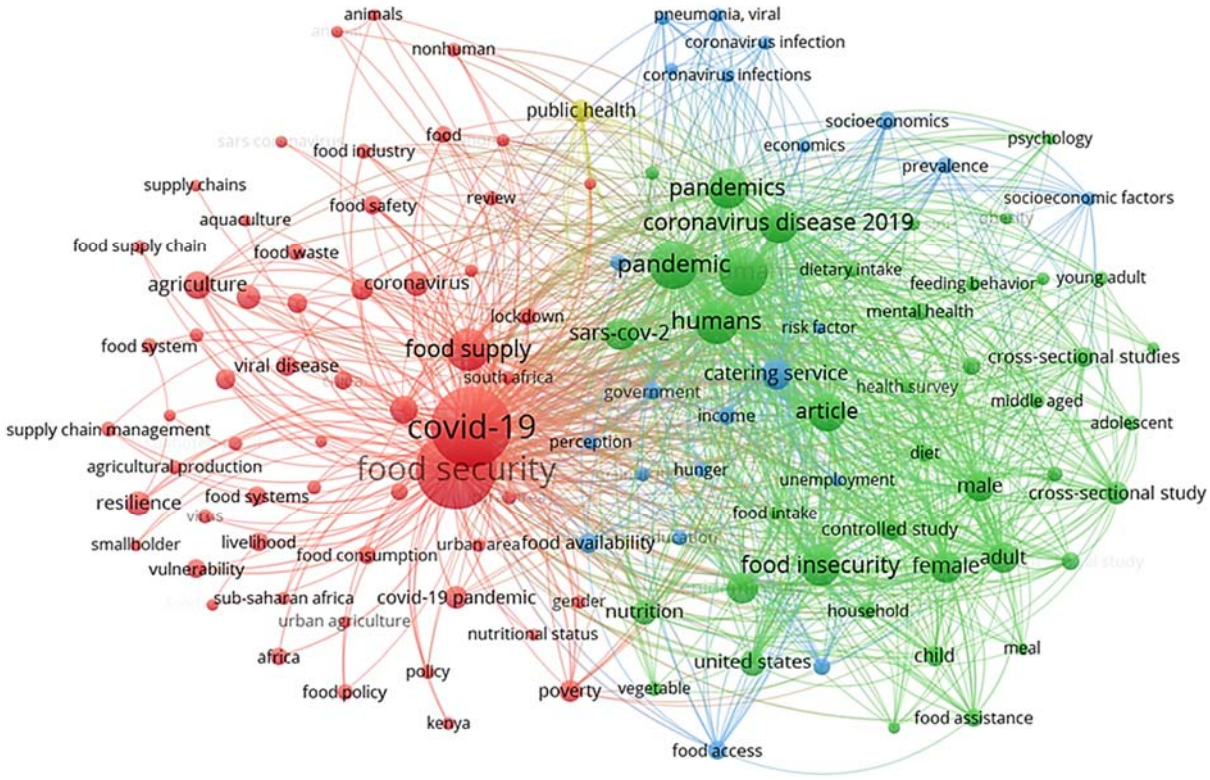

Figure 1 – The network map of keywords to the topic

to the topic based on publications from the Scopus database. This application also created clusters of these keywords. There are three key interconnected clusters to the topic:

– the first (red) cluster includes the direct effects of COVID-19 on food resilience (keywords: food resilience, food security, vulnerability, consumption).

– the second (green) cluster includes the indirect effects of the pandemic on food safety (keywords: food instability, mental health, feeding behavior).

– the third (blue) cluster is about the socioeconomic consequences of food instability due to COVID-19 (keywords: socioeconomic factors, government, unemployment).

The results of the bibliographic analysis demonstrated diverse (direct and indirect, short- and long-term, local and global) effects of the pandemic on food systems. It also underlines the importance of global food system resilience in mitigating the negative consequences of such shocks as a pandemic or a war.

As it was mentioned, the next step of the literature review was the more detailed analysis of publications on the topic. There is some research on the impact of crises on food systems. For example, Mireya Vilar-Compte and colleagues investigated the role of the financial crisis of 2008–2009 on food security in vulnerable regions [3]. The authors concluded that low-income economies are more exposed to the negative consequences of any shocks. Scientists also emphasized that governments and international organizations failed to respond effectively to the food problem during the Great Recession 2008–2009. Nasima Akhter and others considered the impact of this crisis on Nepal as a country that traditionally has problems with food security. Scientists pointed out that people with low income suffered more from the 2008 food crisis than people with high income [4]. Medical crises (e.g., epidemics or pandemics) also negatively affect agricultural markets. For instance, the Ebola outbreak in Africa had a severe impact on the agricultural sector, trade, and marketing in affected countries. The outbreak disrupted the transportation of fresh products from farmers to local markets, leading to a shortage of essential supplies, including humanitarian aid. Supply chains were also affected as the labor force was limited due to the risk of contracting the disease. Consequently, the prices of foods in some African states rose sharply (on average, by 25%, but for some products – by more than 40%) [5].

Much research considers the impact of the COVID-19 pandemic on local food resilience. Monica K. Kansiime et al. surveyed households in several African countries that indicated a 6% increase in food insecurity. Additionally, this survey showed a change in the pattern of food consumption during the crisis. Even among people with a high level of income, the consumption of more expensive foods (in particular, fruits and berries) has significantly decreased [6]. The problem of food supply in urban areas in Asia was discussed by R. Padmaja and colleagues. The authors emphasized the importance of community food resilience to overcome the negative consequences of restrictive lockdown measures [7]. Similar research was done by S. Tarra et al., who analyzed the impact of

COVID-19 on food stability in a high-income economy (Italy). The results underlined the importance of governmental intervention in such a critical situation to avoid market failure [8]. Overall, the literature review highlights the complex and multi-faceted challenges posed by COVID-19 to food systems and the importance of building food resilience to mitigate the impact of the pandemic on food security and nutrition.

Research results. COVID-19 has disrupted global food systems through a combination of factors, including trade restrictions, supply chain disruptions, and reduced access to markets and labor. Problems with global logistics had one of the major impacts on food security in the situation of lockdown measures, according to many scientists [9–11]. The current stage of development of the economies of the world is characterized by processes of globalization, liberalization of trade relations and competition, and close international integration. Most countries of the world position themselves as open economies, the dynamics of which depend on the development of adequate market mechanisms and effective foreign economic relations. Therefore, a disruption of supply chains is a major challenge. Food supply is a complex network that includes producers, consumers, processing and storage, transportation, and sales. With the spread of the COVID-19 virus and the increase in the number of infected people, the global logistics system at all levels was affected. Excessive control of food quality during lockdowns, delaying supplies, left the population without essential products, causing an increase in prices and, sometimes, trade deficits [12]. International experts note that the physical availability of food is determined not only by the supply of agricultural food resources in the country but also by the availability and quality of infrastructure, including ports, highways and railways, communications, warehouses, etc. Economic affordability is determined by available income, prices for agricultural food products, the level of social assistance, etc.

Just after the outbreak of COVID-19, the price of most agricultural products generally remained stable (Figure 2). The researchers point out two major reasons for this initial stability. They include a high level of reserves and record production of some grains under favorable weather conditions in key producing regions. However, several factors began to affect some markets in a few months after the introduction of lockdown measures, including weaker demand, a sharp decrease in the costs of resources (primarily energy and fertilizers), the introduction of trade restrictions, disruptions in supply chains and the implementation of panic buying. The gradual increase in prices for agricultural products led to a decrease in consumers' quantity demanded as well as some change in the structure of the industry.

This pandemic has affected all actors from across the food system. The profound global economic turmoil caused by COVID-19 is affecting the cash flows and financial liquidity of manufacturers due to limited production capacity, low market access, loss of remittances, lack of employment, and unexpected medical expenses. Small and medium-sized enterprises (SMEs) are believed to have been disproportionately affected by the crisis, which has revealed their high vulnerability to supply and demand shocks, especially in terms of liquidity.

Challenges can affect different market stages of production. At the resource supply stage, they include [14]:

– Difficulties in the supply of resources due to the disruption of international chains of added value (restriction of traffic, medical operators, etc.);

– Change in resource prices;

– Depreciation of the national currency (increase in the price of imported supplies).

At the production stage, they are:

– Reduction of production volumes and deterioration of product quality;

– Reduction of investments (capital and foreign);

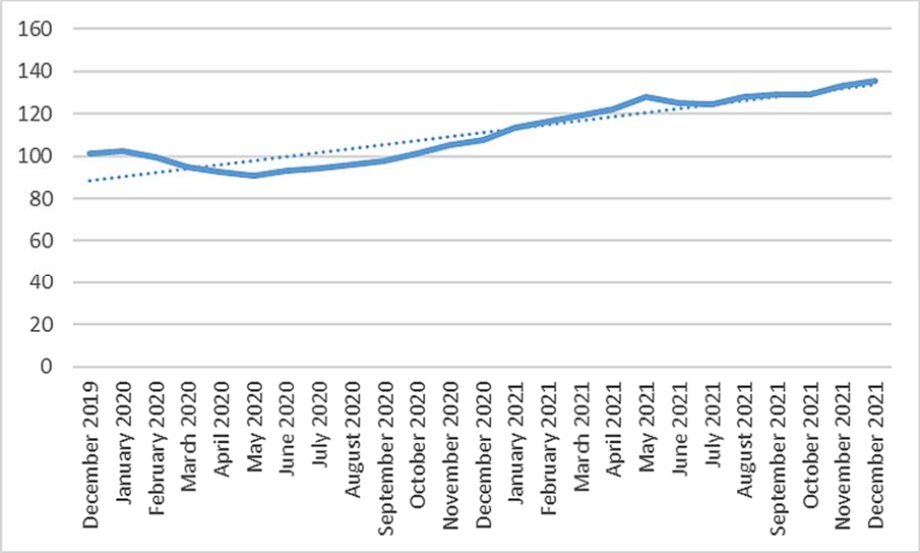

Figure 2 – Food Price Index (year 2014=100 (base)), developed by FAO, with a linear trend line [13]

– Lack of workers for operation, maintenance and supervision;

At the sales stage, such challenges include:

– Decrease in sales volumes, including exports;

– Blocking (restriction) of product distribution chains (both local and international), delay in delivery, increase in delivery costs;

– A decrease in the purchasing power of the population, a change in the structure of demand;

– Termination (slow down, complication) of market access negotiations.

– As a result of restrictive border measures, agricultural sectors in countries where seasonal migration plays an important role have faced significant labor shortages. For migrant workers and their families, the inability to earn money abroad has led to a drop in remittances, affecting their livelihoods as well as access to broader social protections such as quality health care and education [15]. At the same time, agricultural producers in countries where farmers rely heavily on foreign workers have faced severe labor shortages due to travel restrictions imposed to combat the pandemic. This had serious consequences: the production, processing, and distribution of food were disrupted, leading to the loss of crops, and incomes, and the rotting of products.

Some consequences of COVID-19 became apparent only when the majority of restrictive lockdown measures were lifted (the so-called – post-lockdown period). For example, in 2021, the world economy began to recover, causing high inflation (the major reason is high energy prices). However, whereas inflation can be (and was) influenced by the instruments of monetary policy, some other effects of COVID-19 will be more lasting. The researchers from Rabobank (one of the leading Dutch financial institutions) have presented them in the diagram (Figure 3). There are four major sectors, including real economy, geopolitics, human behaviors, and industry&supply chain. In our opinion, it is necessary to discuss them in a more comprehensive way.

The COVID-19 pandemic became an example of a synchronized recession – an economic downturn simultaneously in many states, and the experience of overcoming such a crisis is very valuable. The pandemic has accelerated the adoption of digital technologies across many industries. In the post-COVID period, businesses are likely to continue leveraging technology to improve efficiency and productivity. Most importantly, the pandemic has highlighted the importance of resilience and risk management in supply chains and business operations (especially in the food industry). In the post-COVID period, different stakeholders are likely to prioritize these factors to ensure they are better prepared for future crises. Moreover, the pandemic has also highlighted the need for more sustainable business practices. In the post-COVID period, businesses may prioritize environmental and social sustainability to address issues such as climate change and inequality [17]. Governments around the world have introduced a range of measures to support businesses and households during the pandemic. In the post-COVID period, government intervention is likely to continue to support economic recovery and transition to new economic models.

Conclusions. In conclusion, the COVID-19 pandemic has exposed vulnerabilities in global food systems, highlighting the need for improved resilience and adaptability. The pandemic disrupted food supply chains and caused significant economic and social impacts, particularly on vulnerable communities. While governments, organizations, and individuals have taken measures to mitigate the effects of the pandemic on food security, more action is needed to build stronger and more sustainable food systems.

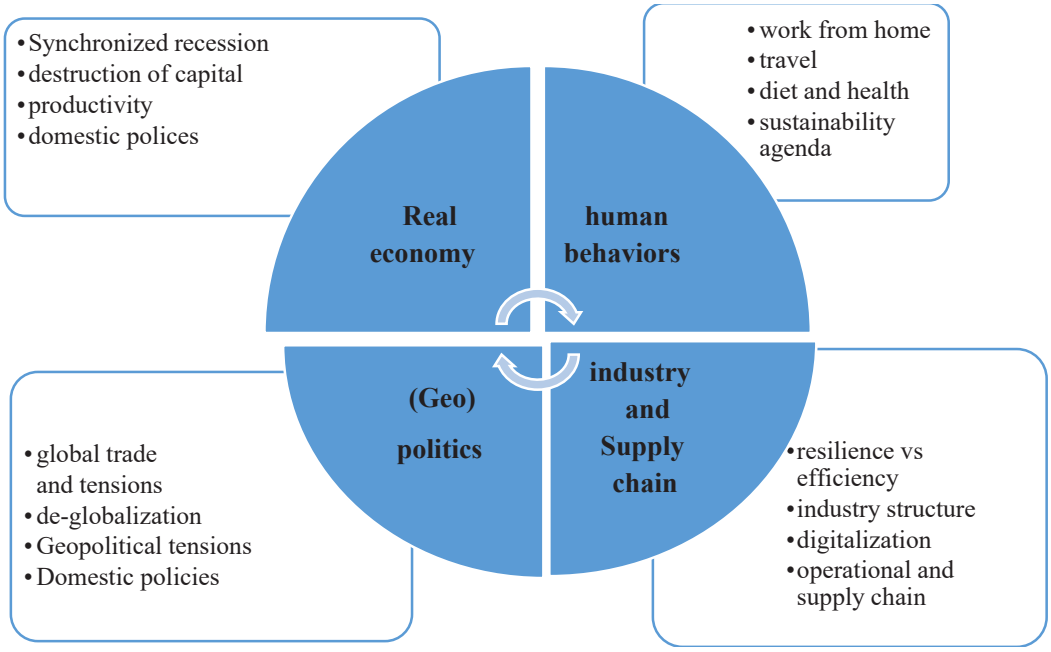

Figure 3 – The post-lockdown effects on the food and agriculture industry [16]

This includes investing in local food production, strengthening supply chains, and promoting equitable access to food. Additionally, addressing the root causes of food insecurity, such as poverty and inequality, is crucial for achieving long-term food resilience. The COVID-19 pandemic has underscored the importance of building more resilient and sustainable food systems that can withstand future shocks and ensure food security for all.

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