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**ΚΕΝΤΡΟ ΔΙΕΘΝΩΝ ΣΤΡΑΤΗΓΙΚΩΝ ΑΝΑΛΥΣΕΩΝ
CENTER FOR INTERNATIONAL STRATEGIC ANALYSES**

Nutrition Crisis during the COVID-19 Pandemic

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Introduction

The COVID-19 outbreak has significantly impacted food safety, thus pointing out all the flaws that existed even before the outbreak. Global warming and hunger in third world countries coupled with the burden of pervasive lockdowns and resulted in a "shaky" food market. As soon as there was a wave of panic about stopping the spread of the virus, increased food shortages were noticed on the market, due to the restrictions imposed on logistics and social services. Consequently, access to fresh food has been restricted in many countries. Moreover, individuals involved in agricultural business have reported huge losses and difficulties in communicating with customers, especially in the context of international trade. The corona virus pandemic, in just one year of its duration, doubled the number of people affected by hunger for economic reasons as well. Poor populations, even in developing countries, suffer drastically from reduced incomes, with the result of poor nutritional quality. Lessons based on facts and actions taken during previous outbreaks, such as the H1N1 and Ebola outbreaks are particularly helpful lessons for the current governing prime ministers. Numerous overt collaborations between the governments of the affected countries can avert an economic and food crisis that can affect every citizen of the world.

I. COVID-19 AND FOOD CRISIS

The first cases of corona virus disease, COVID-19, were reported in December 2019, in Wuhan city, China. With travel between countries and continents being very easy these days, the disease has started to spread at a very fast pace. Just four months later, in March 2020, Italy became the new epicenter of the disease. After that, the number of cases steadily increased, whether in Europe, the US or Australia. The virus was somewhat slower to reach less developed countries, due to limited air transport and fewer tourists and business centers. The COVID-19 outbreak has been considered one of the largest global health crises after World War II, as nearly 200 million cases have been diagnosed by the end of July 2021, with 4.18 million deaths to date.

With numerous lockdowns in place, the economy coming to a standstill on many levels, the food service, tourism, hospitality, and retail industries frozen, 2020 and 2021 can be considered the years of economic crisis with most economic sectors grinding to a halt, huge numbers of people have

lost their jobs, or their wages have fallen dramatically. Another effect of the "COVID-19 dominoes" is the emergence of global food crisis.

Due to government-imposed restrictions on the movement of people and disruptions in supply chains and trade, food and nutrition security for many people, especially in poor countries, has been compromised. This is not the first time this has happened, as a similar phenomenon was seen in previous years during the Ebola and avian flu outbreaks. During these epidemics, there was a sharp increase in prices, which is clearly visible during the outbreak of the corona virus. In connection with the sharp increase in prices and the significant drop in salaries, it is not difficult to draw the conclusion that the poorest social groups may face financial problems related to the purchase of food (Laborde Debucquet, 2020).

Even before the COVID-19 outbreak began, it wasn't hard to see the food security issues. Worsening global refugee conflicts, economic inequality, and religious conflicts in the Middle East have not been conducive to the proper development of food economies in poorer regions. Current data published by the Food and Agriculture Organization of the United Nations (FAO), states that more than 820 million people worldwide suffer from hunger. This number is huge, because it is significantly higher than the number of people living in Europe (Nations, 2020).

As a result of COVID-19 pandemic, there is a significant increase in the number of people suffering from hunger in the world. Sources describe that the percentage of such people may be even higher by 20%. All of this is due to economic impediments such as lockdowns and restrictions on the movement of goods and materials. This fact has caused a significant reduction in food production efficiency due to a lack of materials needed for production and workforce, without which there can be no talk of industry (UNICEF, 2020).

In addition, many countries that previously had food assistance programs have stopped them, leaving the undernourished without assistance. It has been noted that people who previously led average lives, during the pandemic have begun to complain about prices, and as a result have chosen cheaper, less nutritious products. The economic data is unrelenting. Shortly after the outbreak, a large economic slowdown was noted. Taking China as an example, in the first four months of 2020, just as the pandemic was gaining strength, the economy decreased by -6.8%. This result is extremely alarming and is significantly worse than the result obtained during the years of the great economic crisis, which occurred in 2008/2009 (HS & A, 2020).

However, the situation related to the current pandemic is different from other epidemics. The Ebola epidemic affected underdeveloped countries, among other African countries. In reference to the COVID-19 pandemic, there is already news regarding food insecurity in rich, developing and poor countries. It remains clear that rich countries are not affected in the same way as developing countries, and for this reason, they should be the focus of attention. Unfortunately, hunger monitoring in these countries is not developed. Moreover, the governments of poor countries do not have enough resources to help and provide food for the poorest citizens. During the delta variant outbreak in India, the country's economy was badly shaken (Programme, 2020).

The economic data are not kind. Recent reports suggest that during the year of the ongoing outbreak, there were approximately 360 millions of people suffering of poorness. The largest number of people considered as poor by the COVID-19 pandemic are in sub-Saharan Africa and Asia, particularly India. This event is happening, because Africa's economy is more dependent on trade. Asia, on the other hand, is dependent on industrial productivity. Due to the many restrictions, most factories have stopped their work. The paychecks for people in industry in Asia are very low, making it impossible to have some "emergency" savings. Therefore, when the world came to a standstill, production and factories stopped and workers were left without a paycheck, thus deepening the poverty of the population (Cullen, 2020).

In summary, the corona virus outbreak, in just one year of its duration, doubled the number of people affected by hunger. Poor populations, even in developing countries, suffer drastically because of the reduced incomes, resulting in poor quality nutrition. Such people have stopped buying vegetables, fruits and meat. These behaviors will result in malnutrition and impaired micronutrient intake from food. As a result, the overall health of the population may be compromised, resulting further in disease (Fore et al., 2020).

II. COVID-19 EFFECTS ON GLOBAL FOOD MARKETS

As mentioned earlier, the COVID-19 outbreak is the biological agent that has hit the global economy the hardest in the 21st century. Taking an analytical approach, we can see that looking only at the food market, a similar situation occurred during the avian influenza (H5N1) and influenza A

(H1N1) epidemics. During the avian flu epidemic, the population was clearly discouraged from purchasing chicken meat. Farms and the people working on them mostly stopped to work. This situation generated huge losses in the poultry industry. In addition, large transport and supply disruptions and inactivity of workers were reported. Consequently, a halt in economic development was observed (Sharma et al., 2021).

Food shortages reduced family incomes and food insecurity among poor groups, especially children, women and the elderly, were reported in poor countries. The COVID-19 pandemic is often compared to similar viruses that caused epidemics in Asia in the 21st century. These viruses are SARS and MERS, but their impact on food safety has been limited. A case was reported where the wheat harvest was halted for two weeks and the country was in a state of panic about a possible economic crisis, but there was no increase in market prices. In addition, there are reports of agricultural production stoppages in China, Singapore and South Korea, but these countries have strong and stable economies, so such a small agricultural stoppage was not able to disrupt the incomes of classic families in these countries. Moreover, the governments of these countries, in order to ensure a regular agricultural supply, decided to link agricultural markets and internationalize them, in order to provide agricultural food for every family living in the affected country. As a result, supply chains were maintained, and no family was cut off from the ability to buy their favorite vegetables, grains, or fruits (Yu et al., 2020).

Moving on to the next continent, Africa, where the Ebola outbreak occurred, in this case the outbreak has left a much larger impact on the economies of African countries. Agricultural production and trade almost came to a complete standstill. As the region is poor, feeding the population in African countries has become a huge problem. These disruptions projected huge increases in food prices. Few Africans, especially those living in countries particularly affected by the epidemic, could afford to buy agricultural goods. What's more, there has been a significant economic downturn, which has hit developing Africa hard. According to data, the outbreak was most widespread in countries such as Guinea, Sierra Leone and Liberia. More than 30,000 infections were detected, and the number of deaths exceeded 11,000 (Sochas et al., 2017).

During the outbreak, quarantines were imposed en masse on workers in various economic sectors. Agricultural production and food supplies virtually declined by 70%. Mass migration from the affected regions was also observed. These migrations were motivated by economic reasons, but unfortunately, also promoted the spread of the virus to other areas, where the virus had not yet had its

outbreak. Only after time had passed, people who had not migrated were ordered to stay where they were. The ever-present chaos and disorganization led to missed growing seasons in agriculture, because there were many regions where, due to emigration, it was impossible to find people willing to work on the land. It is not difficult to guess that this situation resulted in a lack of agricultural products on the market and an economic crisis (Lo et al., 2017).

A rather strange phenomenon was noticed next. Agricultural products became very expensive at first, because of the lack of right amount of products on the market. Then, it was noticed that few consumers were interested in buying them due to lack of livelihoods. As a result, prices of agricultural products began to fall dramatically and became extremely difficult to resell. It is also worth noting that agricultural products have a short shelf life, so trade was limited by the time frame. The crisis began to worsen because farmers did not earn enough money, and on the contrary, they began to lose income due to unsold goods. Transportation of agricultural products to other regions was also hampered as many people quit their jobs due to fears of contamination with the virus. Moreover, the rest of the world was also cut off from the countries affected by the epidemic. As a result, potato prices in the Fouta Djallon region of the Guinean highlands fell by about one-third and these prices continued long after the outbreak ended (Fan et al., 2020).

An important fact worth discussing is the trade distortions that resulted in an inadequate supply of imported food. This is evident, *inter alia*, in the case of rice. Haulers from countries not affected by the epidemic abandoned trips to Guinea, because the crews were not willing to work on those trips. In addition, African countries that were not affected by the epidemic also fenced themselves off from Liberia. Senegal closed its borders for several months and stopped transporting food from the affected countries (Robertson et al., 2020).

The World Bank ruled economic losses from the Ebola epidemic between 2014 and 2016 at \$2.8 billion, including \$600 million in Guinea, \$300 million in Liberia, and \$1.9 billion in Sierra Leone. Liberia's real GDP growth slowed to 0.7% in 2014, from 8.7% in 2013. It can be concluded that the decline is dramatically high. Therefore, we can speak of a tragedy that has affected many African families. The worst part is that the Ebola epidemic has passed, and food prices are still very high, while incomes are still low. It can be mentioned that the economic effect of the epidemic after 7 years unfortunately persists (Fore, 2020).

Observing and learning from previous epidemics is very important. The effects of the epidemic, which was an epidemic on a much smaller scale, still persist nowadays. People are still starving, and they continue to suffer from economic hardship, insufficient wages and high food prices. As a conclusion, there is a persistent state of hunger in countries that were previously affected by the epidemic. In view of the above, we can only imagine how great will be the economic impact, over many years, after the end of the SARS-CoV-2 pandemic. Unfortunately, there are not many articles that focus on describing the magnitude of the problem. At the moment, we can only imagine the magnitude of the problem if, after the Ebola outbreak, some countries are still struggling with many economic problems (Fan et al., 2020).

However, during the COVID-19 global crisis, the grain markets remain quite stable. Due to good harvests worldwide in the year before the outbreak of the corona virus, cereal prices fell by 4.3% the following year. Unfortunately, by 2020, many countries have implemented numerous export and import restrictions. For example, Kazakhstan, one of the world's largest exporters of wheat flour, has banned exports of the product along with others, including carrots, sugar and potatoes. European countries also did not remain passive and closed export gates to many countries during the first wave of the outbreak in 2020 (Almarayeh, 2021).

Using the example of the Ebola crisis and the economic crisis in the first decade of the 21st century, we can see a correlation that if export bans are imposed, food prices can be shaken and put into a kind of instability. Many experts see a lot of similarities between the current and previous export bans. In both cases, the bans were imposed as a result of supply shortages, and the panic created by fears over the potential risk of contamination only made the situation worse. Economists fear that the upcoming fall and the projected increase in illnesses will cause another economic shutdown. Countries that are considered to be reigning in the export sector have struggled with a number of restrictions that have also had the effect of limiting exports. These countries include the United States and Russia, among others. Learning from the past, we can expect to see more export ban declarations from organizations such as the G-20, the United Nations and the WHO (Lo et al., 2017).

Analyzing past situations, economists suggest a potential adoption of the Chinese model in the fight against lockdown. There is no denying that China has done quite well economically, comparing the size of the lockdown and the restrictions. As mentioned earlier, China was lucky, because of its food production in the year before the pandemic was much higher than in the year

before. In addition, grain stocks were high enough so that the Chinese could feel secure, even in the event of a longer break in tending and harvesting. Experts estimated the stockpile to be large enough for a year of downtime, which is especially large when you consider the large population of China (Guo et al., 2020).

There has been much speculation about an agricultural crisis in China triggered by the COVID-19 outbreak, with economists describing the phenomenon of surging prices of food products in the market. However, after further, more detailed analysis, it turned out that this phenomenon was caused by another epidemic, namely African swine fever. Farmers complained about many illnesses and deaths among pigs, so the price surge was rather caused by the increased price of pork. This was followed by a rise in consumer prices of almost 1%, where food alone rose by around 4.5%. In May 2020, less than five months after the outbreak, there was a drop in prices by 3%, and in July 2020 by another 1.2%, so we could say that prices returned to the state from the period described as “before the pandemic”. By the end of the summer of 2020, Chinese economists breathed a sigh of relief, confirming that the economic damage caused by the COVID-19 outbreak had been contained (Akon & Rahman, 2020).

In contrast, feedback from businesses involved in meat and livestock production and rearing is not that positive. Entrepreneurs complained of a stagnant flow of materials needed to keep animals, insufficient feed to feed the animals, and fear among workers who stopped coming to work. In addition, employees who said they wanted to continue working, but had previously left the area of living, could not return to work because of restrictions on movement between areas. It was reported that millions of chicks and baby ducks were buried as a result of these problems. This meant the bankruptcy of the farming company in a large number of enterprises. Farmers, who were only involved in one industry, had no way of earning money for living. The figures were very pessimistic. The poultry industry saw its income halved. The poultry sector has seen its income halved. In addition, the ever decreasing demand in the pork trade is not encouraging (Soares & Müller, 2020).

The seed industry has also been affected by the pandemic. Up to 90% of seed traders have reported an economic crisis or impending financial problems. The reason for this was the reduction of transport, lack of staff and the omission of important dates in the seed business. Many entrepreneurs admitted that even 40% of sales revenue is zero, i.e., it does not give any income. A phenomenon that is worth investigating is the fact that some food industries recover after a few

months, while others face enormous problems that often result in bankruptcy and no hope of recovery (Gopalan, 2020).

The Ministry of Agriculture also anticipated that as a result of the agricultural crisis in some farms, especially those particularly affected by the pandemic would decide to fertilize vegetables and fruits with pesticides that are harmful to human health. Such measures would be aimed at increasing the productivity of the crops, and hence, the profits would definitely increase. In this connection, the Ministry of Agriculture has also introduced increased restrictions and controls on the use of pesticides (Ong et al., 2020).

As a result of several good responses from the government, despite the “shaky” food economy, the food supply in China remains stable. So, it can be said that the strategy of dealing with the food crisis has been properly adopted and can serve as a model for other countries to follow. Due to the increasing number of cases of COVID-19, many world leaders are predicting another lockdown this fall. The virus continues to spread, and it is difficult to say when the outbreak will end. Good decisions of economists can save economies from bankruptcy and reduce the severity of the crisis for individual entrepreneurs. A good move would be to follow previously proven models - such as the Chinese model described above. It is also important to coordinate domestic decisions with foreign ones and to coordinate them jointly. The main goal should be to protect the population from famine and economic crisis (Headey et al., 2020).

Based on the above facts, some conclusions can be drawn which may suggest some ideas to prevent a food or economic disaster in this sector. Experts involved in in-depth market analysis suggest increased and more sensitive monitoring of the food industry. Clarity in the transfer of information between the ministry and local farms is also important. Withholding the actual status can introduce misinformation, resulting in the collapse of one of several components. In addition, it is important that the Ministry is consulted on selected decisions made by farmers, so that decisions are always rational and do not result in financial collapse (Boettke & Powell, 2021).

There are many institutions in the world, which are composed of international specialists who specialize in the analysis of given areas of the world. These organizations, if combined, could form an excellent committee specializing in observing the world situation in relation to the pandemic, thereby making recommendations regarding trade, stopping inflation, and the export and import of goods. Creating one joint committee would serve to link economies and avoid economic downtime

in the supply or sale of food products. In addition, it would solve the confusion in the event of the introduction of a strict lockdown in a country that exports products to a country that has not implemented a lockdown due to a good epidemiological situation. Furthermore, this would prevent a shortage problem in the importing country, so no country would be disadvantaged or affected by a shortage of the food (Wuyts et al., 2020).

III. WHAT SHOULD BE DONE?

In view of the experience from previous lockdowns, it is also worth pointing out the importance of a well-functioning supply chain, in other words, a well-organized logistics operation. Well-functioning logistics at homeland and around the world increase the chances of the pandemic crisis being felt less acutely. Even someone not involved in the food sector could see that shopping during a pandemic was different from "normal" times. When it was announced that the corona virus outbreak had begun to spread across Europe, everyone noticed large shortages in the assortment even in the grocery store. People, gripped by panic, began buying up groceries in bulk, fearing that basic products would soon no longer be available. In addition, there was panic about contagion, especially among the chronically ill and elderly groups. These events have led to the development of logistics and Internet sales technology. Many people in the risk group declared their willingness to make online purchases. In many countries there has been a huge increase in online sales of products, and thus the logistical supply between the wholesaler or retailer and the individual consumer has increased dramatically. This phenomenon necessitated the implementation of specialized logistical undertakings. However, it can be said that logistics has been able to develop perfectly in this field (Guo et al., 2020).

Moreover, every effort should be made to reduce the mortality rate due to COVID-19. All lockdowns implemented early on were aimed at reducing mortality of the chronically ill or elderly groups. At a time, when the disease was not wreaking so much on a people's health and life, the restrictions would probably be much lighter. Therefore, a reduction in disease in high-risk groups is equal to a reduction in restrictions. Respectively, it is important to have high self-awareness among people in this group (Łuszczki et al., 2021).

It is also important to provide economic support to food production sectors that have been most affected by the pandemic. The large losses to farmers have resulted in many cases in debt, the sale of qualified machinery to clear debts and mass redundancies. The next pandemic waves may kill off some of the food companies completely, so the existence of some products on the market may be questionable in the future. In order to protect these companies, their employees, but also consumers who value food products, it is necessary to create a system for rebuilding the food sector with internal financing, at national level, but also external financing, in the case of Europe, meaning the European Union (Fan et al., 2020).

However, the world's leading veterinarians and specialists in the meat and zoonotic trade should prepare a preventive plan for the potential spread of zoonotic diseases, or those where animals are carriers of the disease. There are many dangerous diseases that, perhaps, if veterinary measures were implemented, would not be transmitted to humans on such a large scale and would not have such an impact on everyday life (Singh et al., 2021).

The last, but also important point of consideration is the reliability of functioning of Ministries of Economy. Unfortunately, more than one country began with a policy that restricted trade. This has not always been related to the COVID-19 outbreak, however, the COVID-19 excuse has been used. Co-operation on imports and exports means smooth functioning of food trade and economic equality and freedom. All the countries of the world should be in solidarity with each other at this time to mitigate as quickly as possible the negative economic impact of the COVID-19 outbreak, including the terms of food (Rahman, 2020).

Conclusions

In view of the possibility of further pandemic waves, there is scope for further restrictions by governments to limit the spread of the virus. Before this happens, governmental Ministries should work together to develop appropriate action strategies that will result in the provision of an adequate amount of high-quality food that is accessible to every citizen, regardless of their financial status. In addition, the compatibility of all food supply links should be checked and if irregularities are found, they should be corrected as soon as possible.

As in other social sectors, it is important to prevent than to cure later. Nevertheless, nutritionists warn that even if measures are introduced to stop the wave of malnutrition in the population for the time being, they might be lost in the course of fighting the next wave of epidemics, where the main focus will be absorbed by medical and health care services. Consequently, it is important to protect the work already done in this direction by competent specialists, who will be focused only on food protection and security. Moreover, a pool of resources should also be created to be managed when food problems arise in the country. Thus, it can be concluded that social protection mechanisms should be combined with food protection systems. With such support, there is a high possibility of success by maintaining a well-funded food system that demonstrates resilience.

In summary, the fight against global hunger requires unity among countries, numerous internal ministerial arrangements, and consequently, funding for programs to protect food security. It is also a good step to intensively observe whether the taken measures are producing desired results and, if necessary, to reform them in order to make them more efficient. Monitoring should also be implemented to detect any disruption in the food trade on an ongoing basis. The proper preparation of the public health sector for the next wave of the pandemic cannot be forgotten, since it is not hard to conclude that the smaller the breakdown in health services, the fewer government measures to stop the spread of the virus will be implemented. Consequently, the economic and food crisis will not be as drastic by then. To conclude, the lessons learned through observations of the economy and food market during previous pandemic waves, as well as the lessons learned from previous outbreaks, would help in understanding what types of challenges exist for national governments and will guide them in making the right decisions regarding actions to counteract the next wave of hunger and poverty.

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