FOOD CRISIS DUE TO THE RUSSIA-UKRAINE WAR

ÉLELMISZERVÁLSÁG AZ OROSZ-UKRÁN HÁBORÚ TÜKRÉBEN

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Abstract

As the food crisis has been exacerbated yearly, particularly after the COVID-19 pandemic, we are facing the most severe food crisis since the 2007/2008 food crisis. What is worse to the global food supply is the war between Russia and Ukraine since Feb. 24 2022, the two combined are the crucial world food suppliers. The risks from war to agriculture and food push our planet into a long-term food insecurity crisis. To clarify and provide a comprehensive review of the heavy influence of the war on the food security crisis, we conducted this literature review based on content analysis. We have found that the Russia-Ukraine war pushes the existing food crisis more severely from the perspective of primary agricultural production, such as cultivation and harvesting, logistics, farmers' financial issues, infrastructure, and price volatility. In order to realize a sustainable future and food security, everyone on the planet is considered an active contributor. In this research, we also appeal to other export countries of food and agricultural products to emphasize their responsibility for world food security.

Keywords

food security; Russian-Ukraine war; simulation risks; food crisis

Absztrakt

Az élelmiszerválság súlyosbodása, különösen a 2007/2008-as élelmiszerválság óta és a COVID-19 világjárvány után, kritikus helyzetet idéz elő. Mindezt tovább fokozza a globális élelmiszerellátásban jelentős szerepet betöltő Oroszország és Ukrajna között, a 2022. február 24. óta dúló háború. A háborúból a mezőgazdaságra és az élelmezésre gyakorolt kockázatok hosszú távú élelmiszer-ellátási bizonytalansági válságba taszítják a világot. A háború élelmezésbiztonsági válságra gyakorolt súlyos hatásának tisztázására és átfogó áttekintésére tartalomelemzésen alapuló szakirodalmi áttekintést végeztünk. Megállapítottuk, hogy az orosz-ukrán háború az elsődleges mezőgazdasági termelés, például a termesztés és a betakarítás, a logisztika, a gazdálkodók pénzügyi problémái, az infrastruktúra és az árak ingadozása szempontjából súlyosbítja a fennálló élelmiszerválságot. A fenntartható jövő és az élelmezésbiztonság megköveteli minden szereplőtől a proaktív közreműködést. A tanulmány felhívja minden élelmiszer- és mezőgazdasági termékek exportáló országa felelősségének fontosságát.

Kulcsszavak

élelmiszer biztonság; Orosz-Ukrán háború; szimulációs kockázatok; élelmiszerválság

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INTRODUCTION

As the food crisis has been exacerbated yearly, particularly after the COVID-19 pandemic, we are facing the most severe food crisis since the 2007/2008 food crisis. What is worse, the war (which started on Feb. 24 2022, and is still ongoing) [1] between the world's main food and agriculture export countries pilled top of the food crisis. The war between Russia and Ukraine, the COVID-19 pandemic, and extreme weather push our planet into a long-term food insecurity crisis [2], [3].

It is reported that close to 193 million population is acutely food insecure and in need of urgent aid in 2021 [4]. Food insecurity is estimated to persist at a similar level in 2021 or increase in 2022. However, the unfolding war between Russia and Ukraine exacerbates the food crisis, which is not considered even in the estimation of the mentioned report, Sixth Annual Global Report on Food Crises, 2022 [5]. Besides, even those countries heavily rely on grain imports from Russia and Ukraine, especially the Middle East and North Africa, do not have an obvious shortfall in a short run period, such as in March of 2022, they need to afford the higher price and additional transport costs from other farther suppliers [6].

Therefore, conducting this research to comprehensively review how the war influences or accelerates the global food security crisis is worthwhile. Our responsibility is to alert everyone that we must act immediately to achieve sustainable food and agriculture development. We highlight the simulation risks from the war between Russia and Ukraine [7]. This research was conducted in May 2022 amid the ongoing war between Russia and Ukraine because of the critical importance of these countries' role in the world's food supply system.

Global Network Against Food Crises (GNAFC) [8], an international alliance of the United Nations, the European Union, and governmental and non-governmental agencies (Global Report on Food Crises, 2022) announced a 3×3 approach to tackle the root cause of food crisis, promote the sustainable food systems and agriculture, and support the Sustainable Development Goal to End Hunger (SDG 2) at a regional, national and global level: understanding food crisis, leveraging strategic investments in food security, nutrition, and agriculture, going beyond food [5] (Figure 1). This research analyzed the simulation food security risks of the war between Russia and Ukraine and addressed the food crisis according to the 3×3 approach [9].

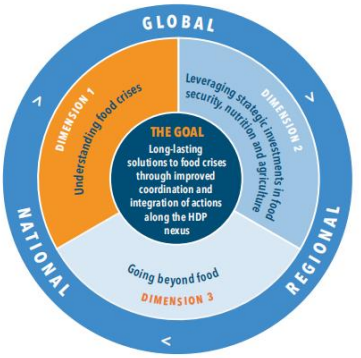

Figure 1 The 3 x 3 approach to addressing food crises
Sources: FSIN, GRFC 2022.

The research result contributed a literature review basis for future research on the influence of war or conflict on countries at war from the perspective of world food security and food safety. In addition, the influence of war or conflicts on other important agricultural countries which are not at war from the view of the world food supply.

METHODOLOGY

In order to provide a comprehensive review of the food security crisis due to the war between Russia and Ukraine, we used secondary research review [10] and content analysis [11] as our research methodology. The secondary research data are from prestigious journals related to the research topic and some international official organizations' websites (reports and database), such as the UN and FAO.

RESULTS

Our planet is suffering from a period of hunger on an unprecedented scale and the historical peak of food prices [5]. The war between Russia and Ukraine has brought catastrophic disaster to the world food supply [12]. In this research, the simulation risks of food and agriculture in Russia and Ukraine from the Ruassia-Ukraine war were discussed in detail. The simulation risks are mainly from aspects of the cultivation and harvesting season destroyed in Ukraine, transportation of food and other agricultural products influenced by the black sea, farmers in debt and poverty, civilian infrastructure destroyed, price volatility of food and agricultural input products, worse existing food security issues.

Cultivation and harvesting season destroyed

According to the FAO report of Ukraine [13, p.], the winter crops (wheat and rapeseeds) sown in October 2021 should be harvested from June onwards. However, the Russian and Ukraine war outbreak uncertainly disrupted the winter crop harvesting resulting in population displacement (less labor force), restricted access for farmers to fields, and a lack of economic resources. As of Apr. 01, more than 11 million population have been displaced [14]. As of Mar. 25 2022, it is estimated that about 20-30% of winter sown crops will be unharvested during the 2022/23 season, and it will also negatively affect the spring planting cycle [15]. The escalation of the war also negatively impacted Ukraine and its neighboring country's farmer's capability to control animal diseases, notably African swine fever (ASF) [16]. The planned sunflower seed and spring cereal crops planting period started in April, facing fuel shortage challenges. As of Apr. 18, 17.6 percent of the planned sown area (2.5 million hectares) was completed, which is about 80% of the planned spring crops in 2021[17]. Even the seeds and fertilizer can be 70-80% enough for the needs, but the delivery to farmers cannot be sure due to the logistic interruption from the war. Compared to 2021, sunflower seed and maize planting could decline by 30% in 2022, and sunflower seed and maize yields may decrease by 20% below the average level [16].

In the case of Russia, the international sanctions imposed on it will also influence food export. Once Russia loses the food export market, the farmers' income will be decreased, impacting the coming decision-making on planting. The international sanctions on Russia could also influence necessary food imports, such as seeds and pesticides. The constraint of food input access exposed Russia to high risks of fewer plantings, lower yields, and

lower quality, which will also profoundly affect the global food market as Russia is one of the biggest global food suppliers [16].

Transportation of food and other agricultural products are influenced (black sea)

In the case of Ukraine, the war could also damage the inland transport infrastructureand seaports. On the other hand, the processing and storage infrastructure is also under insecurity risks. Black Sea is responsible for 75% of the world's sunflower oil exports, 30% of the world's wheat exports, and 20% of the world's maize exports [14]. Due to the conflict, the insurance premia for vessels destined to berth in the Black Sea region could raise the already high cost of maritime transportation [16]. Even though some vessels have been hit by shelling since the war. Usually, the maritime capacity of commercial shipments accounts for 90% of the total commodity export in Ukraine, but as of March 2022, Ukraine suspended the Russian Black Sea ports. "Black Sea ports are necessary for food export for Ukraine." said an officer in Ukrainian Agricultural Department [18]. Ukraine tried to figure out other exporting solutions via railway through neighboring countries. However, the capacity of any railway shipments is a constraint [14] of the rail carriages and the conflicting railcars' chassis between Ukraine and other neighboring countries, such as Poland. The longer halt of food exporting requires a higher condition of storage, such as a silo. Oilseeds can be more fragile and have a shorter storage duration than grains. Besides, the labor force is lacking in the supply chain as some international corporates in grain and oilseed export sectors recalled their employees for their safety guard in Ukraine [16].

Farmers will be into debt and poverty

Due to the shock of the Russia and Ukraine war, global economic growth will slow significantly in 2022. Ukraine is expected to drop a severe double-digit GDP in 2022, and the economy will contract by 35% in 2022 because of the invasion. Moreover, the population displacement, death, and destruction of physical capital hit severely in economic recovery. For Russia, the huge shrink is also estimated from the international sanctions and European countries' restrictions on energy imports, such as the loss of correspondent banking privileges, access of some banks to the SWIFT payments system, the interdiction of central bank assets, an embargo on oil and gas [19]. The depreciation of the Russian rouble makes agricultural products cheaper, but the cost of agricultural machinery and other production facilities is elevated. Similar challenges also happened to the weakened Ukrainian hryvnia since the war, which can also reduce remittance flows, the main factor of GDP. The depreciation of the Russian rouble and Ukrainian hryvnia also influences other countries that have a tight relationship with them. The contraction and damage in the Russian and Ukrainian economies have negatively impacted their food and agriculture since the purchasing power of households shrunk. At the same time, the agrifood products price increased. Even if there are available agricultural input products, some farmers might not be able to afford the increased price [10]. However, before the war, the COVID-19 pandemic had already resulted in a debt burden to the low and middle-income countries [11.

Civilian infrastructure destroyed: agricultural land, farming equipment, and supply chains

The agricultural livelihoods in the conflict-affected area and across the country are disrupted directly by the constrain of civilian displacement and commercial activities and

the damage to farming equipment and infrastructures, such as critical fuel, gas, electricity, buildings, homes, water management infrastructure, health facilities, and schools. As of Apr. 01, it was estimated that around 100 billion USD of infrastructure had been destroyed in Ukraine due to the war with Russia. It has been reported that several cargo vessels and tankers got attacked, and the grain storage and exportation infrastructure were damaged in Ukraine. Many ships carrying food or agricultural products are blocked in the black sea region or remain in Ukraine. And some agricultural companies paused operations, consequently influencing the agricultural commodities export, and the oilseed crushing operations were also suspended in Ukraine. The Ukraine government estimated that the Ukrainian economy contracted only by about 35-60 percent in March. And there were likely 50 businesses relocated from the east, where are most conflict-affected areas, to the west till Mar. 19, including domestic and foreign businesses [14].

Price volatility of food and agricultural input products

It is vital to monitor food price volatility than at any time before since the food price crisis in 2007-2008 and 2010-2011 [20], as the unfolding war between Russia and Ukraine brought more uncertainty to the food market and food security to millions. Before the war between Russia and Ukraine, food prices were already high [20]. The COVID-19 has shocked all industries since 2020, the labor markets are still struggling to recover from the pandemic consequences, such as shrunk income, and 60% of low-income countries are in debt or at high risk [6]. FAO estimates that the cereal production in 2022 can not be sufficient to meet the requirements in the 2022/2023 season, and the demand for cereal production will increase, keeping the rising pace of the increasing population. At the same time, tighter supplies and uncertain markets, such as the rising price of energy and input, will make cereal prices high in the coming season in 2022/23 [21]. The war between Russia and Ukraine just pushed up this food price inflation by disrupting the global grain supplies, natural gas, and fertilizer market, and the producers for harvesting and planting in a new season [2]. On the other hand, the raised cost of agricultural input products will further pressure farmers to start a new planting season [14]. Since the outbreak of the war, many countries suspended part of the agricultural commodities export, such as food and fertilizer, for safe domestic food supply, including Russia and Ukraine, which also drove the food price volatile. The increasing price of fertilizer can be an important threat to food production, raising the food price [20].

The existing food security issues will be worse after the war

The area around the Black Sea, including Russia and Ukraine, is known as "World's bread basket" which has fertile soil and high rates of grain production [22]. The region of the black sea has been a significant global supplier of grains and oilseeds for the last 30 years [2]. Due to the catastrophic disaster of COVID-19 and the war between Russia and Ukraine, it is estimated that wheat inventories are at 33% of annual consumption, a level not seen since 2007 and 2008 [23]. Sara Menker, the CEO of agriculture analytics firm Gro Intelligence and food insecurity expert, said, "The Russia-Ukraine war was not the cause of a food security crisis but simply added fuel to the fire that was long burning." And "We currently only have ten weeks of global consumption sitting in inventory around the world. Conditions today are worse than those experienced in 2007 and 2008." at Conflict and food security - Security Council, 9036th Meeting on May 19 2022 [24]. In Ukraine, the export

volumes shrank significantly due to the halted Black Sea and Sea of Azov ship traffic. As of the end of February, 10% of planned wheat exports and 31% of planned maize exports for the 2021/22 marketing year will remain in Ukraine [14].

During the ongoing war, Russia [19] and Ukraine [20] have launched some bans and suspended exports regulation on food products and fertilizers to safeguard the domestic food supply and the raw material needed for domestic processing and livestock industries. Russia introduced a temporary ban on the exports of wheat, meslin, rye, barley, and maize to the countries within the Eurasian Economic Union (EAEU) [25], except Belarus from Mar. 14 2022 until Jun. 30 2022, and white and raw cane sugar from Mar. 15 2022 until end of August 2022 [26]. Russia introduced the temporary export ban again for sunflower seeds and rapeseeds from Apr. 01 to Aug. 31 2022 on Mar. 31 2022 and jointly introduced a 1.5 million tonnes quota on sunflower oil exports and a 700 000 tonnes limit on sunflower meal exports till the end of August 2022 [27]. Ukraine released the export licensing requirements for wheat and meslin, maize, poultry, eggs, and sunflower oil on Mar. 05 2022 [28], which means that the exports of these products are only allowed with the permission of the country's Ministry of Economy. On Mar. 09 2022, the Ukraine government added barley and rapeseed to the list of products for which exports have been suspended since Mar. 05 2022, such as oats, buckwheat, millet, rye, meat, sugar, and salt [29].

Till May 29 2022, 27 countries released export restriction regulations on food and fertilizers [30]. Comparing the impact of the Ukraine war, the COVID-19 pandemic, and the food price crisis in 2007 and 2008 (Table 1, Table 2, Table 3), the share in the world market of calories during the Ukraine war was 17.22%, after the food crisis in 2007&2008 18.69%, and it is 9.97% during COVID-19. However, the influence of calories and the shares are the worst during the Ukraine war, 703, 846 Bn Kcal and 60, 894 million USD (5.79%), respectively.

Category	Number of Countries	Share in World Market of Calories	Count of Products	Bn Kcal	Mio USD	ShareDollars_Total
Grand Total	27	17.22%	59	703,846	60,894	5.79%
Announcement						
Actual Ban	24	13.42%	45	548,339	43,244	4.11%
Export Licensing	8	3.33%	10	136,047	15,680	1.49%
Not Binding Export Taxes	3	0.48%	4	19,460	1,970	0.19%

Table 1. The global export restrictions during the Ukraine crisis, 2022
Source: Food & Fertilizer Export Restrictions Tracker

Category	Number of Countries	Share in World Market of Calories	Count of Products	Bn Kcal	Mio USD	ShareDollars_Total
Grand Total	25	9.79%	44	400,199	32,028	3.05%
Announcement	2	0.12%	2	5,027	290	0.03%
Actual Ban	22	8.01%	34	327,403	27,370	2.60%
Export Licensing	6	0.14%	7	5,569	538	0.05%
Not Binding	1	1.52%	1	62,200	3,831	0.36%
Export Taxes						

Table 2. The global export restrictions during COVID-19, 2020
Source: Food & Fertilizer Export Restrictions Tracker

Category	Number of Countries	Share in World Market of Calories	Count of Products	Bn Kcal	Mio USD	ShareDollars_Total
Grand Total	33	18.69%	59	510,135	42,503	9.32%
Announcement						
Actual Ban	27	12.32%	42	336,356	27,030	5.93%
Export Licensing	3	0.13%	3	3,450	1,147	0.25%
Not Binding						
Export Taxes	9	6.24%	14	170,329	14,327	3.14%

Table 3. The global export restrictions during Food price crisis, 2008
Source: Food & Fertilizer Export Restrictions Tracker

Suppose the fertilizer availability and affordability crisis cannot be addressed. Russia and China were among the top ten global exporters of nitrogenous fertilizer, phosphate fertilizer, and potash fertilizer in 2021 [11]. Due to the Ukraine war, Russia and China announced export bans or export licensing for fertilizer for the different duration (Figure 2), updated on May 29 2022 [22], which together account for more than 20% of global export nitrogenous fertilizer, 3% potash fertilizer and near 20% phosphates fertilizer impacted. In that case, further harvesting will suffer, food prices will keep rising, and the food insecurity problem will be more severe [31].

Policy Status	Category	Country Label	Products	Ⅱ(Starting Date)	Ⅱ(End Date)	Share of global exports of Nitrogenous impacted	Share of global exports of Potash impacted	Share of global exports of Phosphates impacted
Inactive	Actual Ban	Korea, South	Fertilizer: Urea	11/11/2021	03/31/22	0.3%	0.0%	0.0%
Active	Actual Ban	China	Phosphate rock	09/28/2021	12/31/22	0.0%	0.0%	0.6%
		Kyrgyzstan	Mineral fertilizers	02/26/2022	08/26/22	0.0%	0.0%	0.0%
		Russia	Fertilizer	02/04/2022	08/31/22	10.1%	18.7%	8.6%
		Ukraine	Nitrogenous fertilizers (inc. compound)..	03/12/2022	12/31/22	0.9%	0.2%	0.0%
	Export Licensing	China	Fertlizers	09/24/2021	12/31/22	10.6%	1.2%	11.4%
		Russia	Nitrogenous fertilizers (inc. compound)	11/03/2021	05/31/22	10.1%	2.8%	8.5%

Figure 2. List of export restrictions on fertilizers during the Ukraine crisis episode (2022)
Source: Food & Fertilizer Export Restrictions Tracker

From previous experience, including the food crisis in 2007 and 2008, usually, the export restrictions have cascading effect from the first country to announce the export restrictions, and later the others will follow suit. It further exacerbates supply issues and creates a panicked atmosphere in the global market [32]. In order to curb price increases amid the growing global food price [3], close to 20 countries May 26 2022 have taken measures to ensure the sufficient availability of foodstuffs in the domestic market via shortening exports temporarily, such as Kazakhstan, India, Belarus [33], Burkina Faso [34], Serbia [35] etc. For example, Kazakhstan [36] introduced a temporary quota on wheat (1 million tonnes) and wheat flour (300 000 tonnes) export during Apr. 15 to Jun. 15 2022. And it is obliged for exporters to sell 10% of declared export volumes to the state purchasing company in order to meet the demands of local bakeries, flour mills, livestock, and poultry farming. India prohibited exports of wheat on May 13 2022 [37]. As the world's biggest producer of sugar and the second largest exporter behind Brazil [3], [38], India declared the limitation on sugar exports to 10 million tonnes from Jun. 01 2022 up to Oct. 31, 2022, while its sugar export from October 2021 to May 2022 was 78 million tonnes.

DISCUSSION

The war between Russia and Ukraine is still unfolding [1], which means the risks to agriculture and food in Russia, and Ukraine is continuing and unknown. As a result, the world food supply has been under insecurity for an uncertain time due to the Russia-Ukraine war. For example, primary agricultural production is influenced negatively from the perspective of cultivation and harvesting [13], [14], [16], [17], the logistics [14], [16], [18], farmers' financial issues [14], [16], [19], infrastructure [14] and price volatility [2], [14], [20]. Besides, the existing food security crisis will be worse due to the war [14], [24], [32]. The main food crisis risk factors from the Russia-Ukraine war are the infrastructure of agriculture, such as the cultivation and harvesting season interruption, supply chain changes, and producer challenges. Regards value chain, the production, processing and logistics are the crucial stages cause food crsis.

CONCLUSION

As a result, this research result provided a food security crisis due to the Russia-Ukraine war to Russian and Ukrainian policymakers. At the same time, we appeal to other food and agricultural products export countries to emphasize their responsibility for the world food supply. In order to realize a sustainable future and food security, everyone on the planet is considered an active contributor.

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