

RUSSIAN INVASION IN UKRAINE: CHALLENGES AND IMPLICATIONS FOR FOOD SECURITY

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Abstract: *In a global framework disrupted by instability and conflict, both from a social and economic perspective, the primary human needs of the populations are the ones that the policy makers and researchers should keep at the top of their agenda. Therefore, the problem of food security worldwide imposes itself as a very stringent aspect to take into account when evaluating the implications of the current global turbulences. The primary objective of the present article is to review, based on the information available at the regional and global level, the impact of the Russian invasion in Ukraine on food security, and to provide some helpful insights to world leaders whose responsibility is to elaborate adequate policies that minimize the negative consequences of this military conflict, especially considering food shortages. After an in-depth analysis, we identified the fact that the war negatively impacted the agricultural sector, adding on the pressures generated by the Covid-19 pandemic, inflation, and climate change. Although at the regional level, as in the case of the EU, there have not yet been any situations of food insecurity, globally, in the case of countries with a high degree of dependence on food aid and food commodity imports, food insecurity started to manifest since May 2022 putting under risk a considerable part of the population. The results also revealed that, at the global level, the four dimensions of food security – availability, access, utilization and stability – have been affected both in the short and in the long term. Both globally and at the EU level, there have been changes regarding cereal prices, quantity produced, export, and import levels. The EU – Ukraine solidarity corridors were among the methods implemented to reduce the impact of the war on the agricultural sector, and mainly to avoid a possible world crisis and the deepening of food insecurity challenge.*

Keywords: *food security, Russian invasion, agriculture, impact, sustainable development*

JEL Classification: *Q01, Q1*

1. Introduction

Sustainable development constitutes a core element of the global policy agenda, especially in the current framework of international relationships governed by instabilities, disputes, and controversies. As argued by the prior literature, sustainable development implies a three-dimensional perspective, namely: economic, social, and environmental. To this end, there have been several attempts to determine what sustainable development entails, from 'The *Limits of Growth*' report in 1970, initiated by the Club of Rome, to one of the most cited definitions by the literature in the field, elaborated in 1987 by the Brundtland Commission, in which, according to the report titled 'Our *Common Future*', sustainable development is perceived as 'the *development that meets the needs of the present without compromising the ability of future generations to meet their own needs*' (United Nations General Assembly, 1987, p. 43). Meeting the needs of the present entails primarily meeting the basic needs of society, among which the most important one is to assure worldwide population's access to food. Satisfying the basic needs of a continuously increasing population requires an optimal allocation of resources, corroborated with a high level of agricultural productivity. Failure in meeting the basic needs of the society determines negative consequences such as starvation, malnutrition, and even famine (Manap and Ismail, 2019). The United Nations, one of the most important worldwide organizations, developed a set of 17 goals to meet the sustainable development objectives by 2030, among which one of the most urgent is the zero-hunger objective, focusing on reducing the percentage of population confronting with starvation and malnutrition, achieving food security, and promoting a sustainable agriculture. The plethora of existing debates concerning the future economic prospects, impacted by the COVID-19 pandemic, the Russian invasion in Ukraine, inflation, climate change, and accentuating inequalities among nations, highlighted the need to develop an integrated assessment of the sustainable development concept, as well as of the sectors and disciplines whose interconnectedness may generate an impact on its multidimensional framework. According to data published by the United Nations, about one in ten people suffers from hunger worldwide, one in three people do not have access to sufficient food, and the crisis in Ukraine generates a shortage in terms of the supply chain, which primarily affected the group of people facing absolute poverty (United Nations, 2020). Therefore, food security becomes an element located at the intersection of the economic, social, and environmental perspectives on sustainable development.

The primary objective of the present article is to review, based on the information available at the regional and global level, the impact of the Russian invasion in Ukraine on food security and provide some helpful insights to world leaders whose responsibility is to elaborate adequate policies that minimize the negative consequences of this military conflict, especially considering food shortages.

The remainder of this paper is structured as follows: Section 2 contains the theoretical foundation of this paper, providing a short introspection of the most relevant studies concerning the research topic; Section 3 provides an overall analysis of the impact of the Russian invasion in Ukraine on food security from a global and regional (European) perspective. The last section of the article is dedicated to conclusions, implications and recommendations of the study.

2.Literature review

In accordance with the analysed economic context and the historical moment in the discussion, and to adequately mirror the transformations in official policy making, the concept of food security has evolved over the years. Already in 1992, a study conducted by Maxwell and Frankenberger (Hani J. H. and Ashraf K., 2016) had identified over 200 distinct definitions associated with this notion that currently evolved to also incorporate aspects regarding ethical and human rights. The numerous discussions in the literature also focused on the different perspectives regarding the dimensions of food security.

According to FAO (2006), FCRN (2018) the global accepted definition of food security highlights the four most important dimensions of the concept: stability, access, use, and availability. **Stability** - FCRN (2018) states that stability is seen as a separate cross-cutting factor, which implies that every person must always have access to adequate food. This aspect encompasses two other dimensions: food availability and access to it. **Access to food** - It is necessary for the population to have physical access to food in order to purchase enough food for a nutritious diet. Affordability largely depends on prices and household food availability. For example, drought or floods can affect the volume of the harvests generating a price increase that affects both dimensions, availability and affordability (FAO, 2006). **Utilization** – Individuals must have access to clean water, sanitation, and other basic human services to meet all their physiological and nutritional needs. Assuming that food is accessible and available, each household decides what food it buys and how it prepares and consumes it. **Food availability** – This aspect implies the existence of sufficient qualitative food, either domestically produced or imported from other countries. Nationally, food is available from domestic production, imports, or domestic stocks. At the household level, food can be available either from the

individual's own production or from purchasing it from local markets. Wen Peng, Elliot M. Berry (2018) established a link between food security and sustainability considering the fact that food security is part of the Sustainable Development Goals. Challenges such as changing weather patterns, food crises, or even population growth, and agricultural practices which are a pressure on agricultural land, endanger food security and affect its very own sustainability.

In recent years, studies conducted on the topic of food security have focused mainly on the factors that have impacted the most this aspect, like climate change, Russia's invasion of Ukraine and the COVID-19 pandemic. In a study entitled 'Note on the impact of the war on food security in Ukraine', FAO (2022) identified access to food as well as food accessibility and availability as main concerns triggered by the armed conflict. The war has severely affected the economic activities in Ukraine, reducing household incomes. According to the data published by FAO (2022), 34% of respondents to a survey developed by the organization no longer have any source of income to meet their basic needs. Because stores are not operating or being restocked, it is recognized that access to food is the main food security concern. As a result of these market imbalances, food prices have risen significantly. The highest increases were recorded for products such as wheat flour, buckwheat, vegetables, pork, etc. In Ukraine, food availability is not expected to be affected, but due to lower exports and increased domestic grain stocks, availability and access to food in other countries will be affected. Finally, FAO concludes that it is important to maintain production among smallholders and it is crucial to invest in the supply chain as well as in food storage facilities.

According to the European Council (2022), the article entitled 'Food security and affordability of food prices' brought to light the EU's response to the food crisis generated by the war, emphasizing that the war deepened even more the worldwide food insecurity that has been already accentuating since 2016. The Russia – Ukraine conflict has not only generated food shortages but also increased food and fertilizers prices (which have already been steadily increasing since 2020 due to the COVID-19 pandemic), also causing reduced food availability. European efforts are concentrated toward combating the crisis, considered one of the main global challenge. Ukraine's crops are important for global food security, as it is considered one of the world's leading traders of agri-food products. The damage to Ukraine's transport infrastructure also affected its exports, which went mainly to Asia and Africa. Although the EU does not necessarily face food shortages, there are countries in Asia and Africa that are affected by famine. At the EU level, there is a concern about affordability, as prices are experiencing record highs. Considering these aspects and the food crisis, the EU has come to the conclusion that it needs to focus

on aspects like: solidarity (8 billion euros funding allocation for supporting food security for 2020-2024 and exports from the EU to developing countries), sustainable production (aiming for a sustainable food system that does not have negative effects on the environment, increased production especially for sustainable fertilizers), trade (EU sanctions on Russia do not affect the agricultural and food sector, food trade without unjustified taxes), multilateralism (actions to ensure global food supply, for the regular functioning of world markets and the achievement of sustainable food production).

3.Data analysis, results, and discussions

Ukraine is one of the largest agricultural producing and exporting countries in the world, having an important role in the supply of grains to the global market. The agricultural sector in Ukraine provides employment for 14% of its population, while this country is among the highest producing countries in the agricultural sector due to the fact that 55% of Ukraine's land area is arable (USDA, 2022). At the same time, products from the agricultural sector are the most important exports for Ukraine, in 2021 representing 41%, that is, 27.8 billion dollars, of the total exports of 68 billion dollars (USDA, 2022).

Table 1. Agricultural production and exports in Ukraine (2021-2022)

Commodity	Production			Exports		
	Volume (1.000 MT)	Position occupied in the ranking of global producers	% of global production	Volume (1.000 MT)	Position occupied in the ranking of global exporters	% of global exports
Maize	41.900	6	3,5%	23.000	4	12%
Wheat	33.000	7	4,3%	19.000	5	9%
Barley	9.900	4	6,8%	5.800	3	17%
Sunflower oil	5.676	2	30,6%	4.950	1	46%

Source: USDA, 2022, retrieved from: Ukraine-Factsheet-April2022.pdf (usda.gov), accessed: March 11, 2023.

According to data included in the previous table, Ukraine ranked sixth in corn production and fourth in corn export in 2021-2022. Maize production is located in the north-central regions of Ukraine. In 2021, corn exports from Ukraine amounted to 5.9 billion dollars, 30% of which went to the EU and another 30% to China.

Ukraine also exports corn to Turkey, Egypt, and Iran and it managed to deliver by March 2022, 80% of the amount of corn exports estimated for the period 2021-2022. *Expected impact on global food security* – In May 2022 the number of people facing severe food insecurity exceeded 276 million people and estimates show that this number is increasing by 7.6-13.1 million people (European Commission, 2022). Some countries outside the EU, such as Yemen, Israel, Somalia, Madagascar, etc., are the most affected by the conflict because they are dependent on imports of commodities from Russia and Ukraine. Developing countries that are less dependent on agricultural products from Russia and Ukraine may also be affected by the changes that the global market is expected to experience as a consequence of the conflict. Due to the increase in the prices of fertilizers and energy, an increase in the prices of domestic production is automatically generated. In the poorest countries, farmers choose to reduce their production because they cannot afford to purchase fertilizers. If the war continues for a longer time, countries highly dependent on food imports will experience problems and the food crisis will intensify, especially since the war came at a time when food prices were already affected by the Covid-19 pandemic.

Expected impact on regional food security, the EU case – The war did not affect the availability of products at the EU level, but rather their accessibility, because food prices have increased and low-income households can no longer afford the same food as in previous years, being exposed to situations of food insecurity. The EU has sufficient stocks of agricultural and livestock products given that the EU is itself a net exporter on the global market. However, since the outburst of the war, even if the EU is an important exporter, it is also an importer of products that in the short term are difficult to replace from domestic production (like sunflower oil, seafood, etc.). Due to the war, EU dependencies on energy and fertilisers have also been identified, which are important elements for the agricultural sector. The EU usually imports a significant volume of potassium fertilizers from Belarus and Russia, i.e. 59%, and 31% of nitrogen fertilizers from Russia (European Parliament, 2022).

An important aspect to consider and analyse, especially from the accessibility and affordability perspective, is the impact of the war on grain prices at the EU versus the one registered at the global level.

Table 2. Prices of agricultural commodities, January 2023

Commodity	UE			Global		
	Monthly Average	Annual Change	Monthly Change	Monthly Average	Annual Change	Monthly Change
Cereals	EUR/T	%	%	EUR/T	%	%
Soft wheat	297	6.3%	-4.7%	291	-3.2%	-0.6%
durum wheat	460	-4.0%	-3.2%	353	1.6%	-1.8%
Maize	286	13.4%	-1.7%	281	9.3%	0.2%
Barley	272	4.4%	-2.8%	256	-6.4%	0.9%

Source: European Commission, 2023

Based on data provided by the European Commission, we compared the prices registered for agricultural commodities in January 2023 at the EU level and at the global level (Table 2). The monthly average of soft wheat is 297 euros/tonne at the EU level, while the global monthly average is 291 euros/tonne. The monthly average of durum wheat is 460 euros/tonne at the EU level, while at the global level it is 353 euros/tonne, a difference of 107 euros/tonne. The monthly average of maize is 286 euros/tonne at the EU level, while at the global level it is 281 euros/tonne. The monthly average of soft barley is 272 euros/tonne at the EU level, while at the global level it is 256 euros/tonne. At the EU level, the price of soft wheat is higher than the global level by 6 euro/tonne, the price of durum wheat is higher by 107 euro/tonne, the price of maize is higher by 5 euro/tonne and the price of barley is higher by 16 euros/tonne. The prices of agricultural commodities differ from the EU to the global level, being higher in the EU. At the EU level, the annual changes for soft wheat, maize and barley are positive leading to price increases, and only the price of durum wheat registered a decrease. The monthly recorded change is negative, demonstrating the fact that the price of cereals has decreased. Altogether, the annual changes at the EU level for durum wheat, maize and barley are positive leading to price increases and only the price of soft wheat registered a decrease. The monthly recorded change is negative for both soft and hard wheat, showing that the price of cereals has decreased, and maize and wheat registered an increase in price.

Globally, grain prices are lower than those at EU level, one of the reasons being that the poorest countries have a high dependence on imports (such as Somalia, Yemen, etc.) and are more prone to food insecurity than EU countries, which, according to the European Council, are not exposed to the risk of product shortages (European Council, 2023). Another reason why prices have increased in the EU is that the price of fertilizers has also increased significantly.

Table 2 also illustrates the annual price changes, and we can observe that at EU level these changes are significant. All the changes that have appeared in the last period, the Covid-19 pandemic, climate change, the increase in the price of fertilizers, the war, have affected the prices at the EU level more than at the global level. The price differences are: 6 euros/tonne for soft wheat, 107 euros/tonne for durum wheat, 5 euros/tonne for maize, and 16 euros/tonne for barley. Even if in January 2023 the price of durum wheat fell by 4% at the EU level, its price is still higher than at the global level.

We also analysed the impact of the war on the amount of grain produced at EU level versus the global level.

Table 3. Comparison between the amount of grain produced at EU level vs. at global level, 2019-2023 (million tonnes)

	2019-2020	2020-2021	2021-2022	2022-2023 estimates	Change month/month (mt)	Change year/year %
Wheat – EU	155.0	125.7	137.4	133.7	-	-2.7%
Corn – EU	68.1	68.0	71.2	51.8	-	-27.3%
Barley – EU	63.4	54.0	51.6	51.7	-	+0.2%
Wheat – Globally	760.8	773.8	781.1	796.1	+0.4	+1.9
Corn – Globally	1.131,9	1.136,5	1.220,3	1.152,5	-8.5	-5.6%
Barley – Globally	157.6	160.2	145.6	153.1	+0.9	+5.2%

Source: European Commission, 2023

According to the data provided in Table 3, we can conclude the fact that at the global level the amount of wheat produced is continuously increasing in recent years from 760.8 million tonnes in 2020 to an estimated 796.1 million tonnes in 2023, while at the EU level from 2020 to 2023 it experienced a slight decrease, from 155.0 million tonnes to 133.7 million tonnes. At the global level, the change from month to month and from year to year is increasing by +0.4 million tonnes, respectively +1.9%, while at the EU level the change from year to year registers a decrease of -2.7%.

At the global level, the amount of grain produced is increasing, unlike the amount produced at the EU level, which is decreasing, and one of the main reasons influencing the amount produced may be the price level, which at the global level has a downward trend, as opposed to the regional level, where the price registered has an upward trend.

Global maize production shows an upward trend from 1,131.9 million tonnes to 1,220.3 million tonnes in the period 2019-2022. In 2022-2023, the forecast shows that the amount of corn produced globally will decrease to 1,152.5 million tonnes. At the EU level, corn production has the same trend as at global level, it increased during 2019-2022 from 68.1 million tonnes to 71.2 million tonnes and decreases in 2022-2023 to 51.8 million tonnes. The changes from year to year and from month to month at the global level are -8.5 million tonnes, respectively -5.6% and at the global level the change from year to year is -27.3%, the quantity produced decreasing by a significant percentage.

Barley production at the EU level is decreasing, registering a decrease of 11.8 million tonnes in the period 2019-2022. In the period 2022-2023 it registers a slight decrease of only 0.1 million tonnes. At the global level, barley production fluctuates from year to year in 2019-2020 registering 157.6 million tonnes, in 2020-2021 the quantity produced increases to 160.2 million tonnes, in 2021-2022 the quantity produced decreased to 145.6 million tonnes and in 2022-2023 this increased again to 153.1 million tonnes. Changes in global production are +0.9 million tonnes, respectively +5.2%, which means that the quantity produced is increasing and at the EU level it also registers an increase of only +0.2%.

Following the analysis of the amount of grain produced at the global and regional levels, in the case of the EU, we identified the fact that at the EU level the amount of grain produced is in a slight decrease, while at the global level it registers increases in production.

On the other hand, we could observe the impact on prices. At the EU level prices have increased while at the global level they have decreased. This may be due to the fact that at the regional level, in the case of the EU, the quantity produced decreased, causing the prices to increase again, while globally, due to the fact that the quantity produced increased, the prices fell, being enough quantity to supply the market. Our research also focused on analysing the impact of the war on grain exports and imports at the EU level vs. global level.

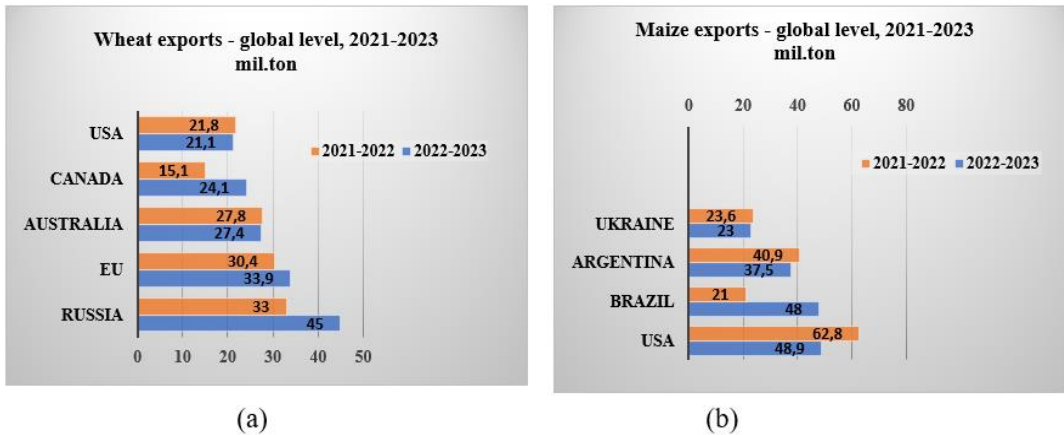


Figure 1. Global exports of (a) wheat and (b) maize, 2021-2023

Source: AMIS, taken from: <https://www.amis-outlook.org/indicators/amis-crops-at-a-glance/en/> , accessed: March 20, 2023

According to the graph, we identified the fact that wheat exports globally start to increase in 2022-2023, also at the EU level, they increase from 30.4 to 33.9 million tonnes. Russia is the main exporter, exporting 45 million tonnes of wheat in 2022-2023. As of March 2023, according to AMIS (2023), global wheat production is 794.63 million tonnes in 2022-2023, of which 779.49 million tonnes are consumed and 305.67 million tonnes in stock. Maize production is 1,157.62 million tonnes, of which 1,182.75 million tonnes are used and 280.24 million tonnes are in stock (AMIS, 2023). At the EU level, exports have continued to grow since April 2022 when solidarity corridors were created, permitting exports from Ukraine to resume. Exports from Ukraine are important at the EU level, this country being an important producer of cereals. Unlike in the EU, globally, corn exports are declining. Therefore, global exports were more affected than those at the EU level. With the help of these data, we can confirm that there were no difficulties related to food security at the EU level. Through the solidarity corridor, farmers were able to continue their activity and contribute to increasing exports and food security.

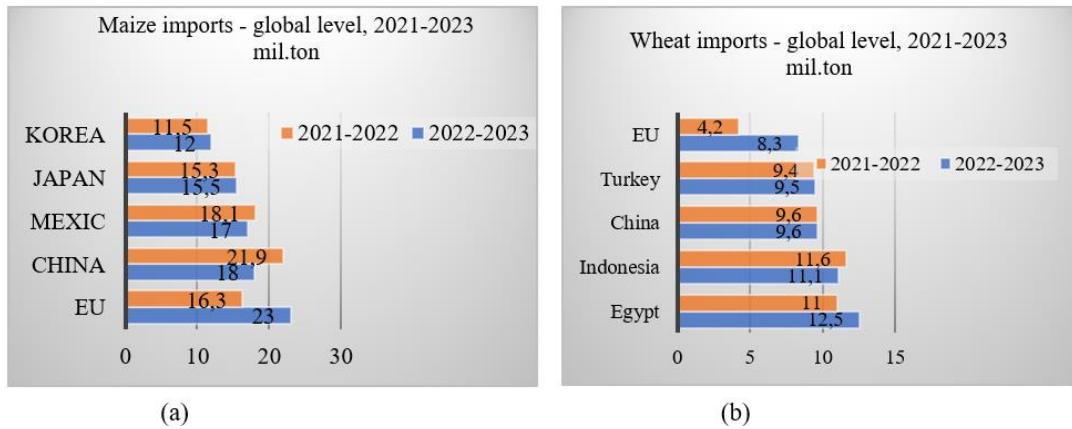


Figure 2. Global imports of (a) maize and (b) wheat, 2021-2023, million tonnes

Source: AMIS, taken from: <https://www.amis-outlook.org/indicators/amis-crops-at-a-glance/en/> , accessed: March 20, 2023

At the EU level, since February 2022, grain imports have continuously increased, one explanatory cause being that people panicked about running out of products and bought significant amounts in excess. Globally, maize imports decreased in 2022-2023 and wheat imports remained almost the same, with only the EU and Egypt importing more than in 2021-2022. So, even if in 2021-2023 grain imports at the global level tend to decrease, at the regional level of the EU grain imports are increasing. Despite prices rising in 2022-2023, production volume falling, EU exports/imports increased compared to 2021-2022. Globally, even though the amount of production increased, and prices decreased, exports/imports increased.

4. Conclusions, implications, and recommendations

The present research revealed the fact that the implications of the war on the agricultural sector are negative; however, at the regional level, in the case of the EU, there have not yet been any situations of food insecurity. Globally, in the case of lower-income countries that are dependent on commodity imports, food insecurity became evident in May 2022 and the number of people facing it may increase especially since the conflict continues and additional challenges rise. On the other hand, the four dimensions of food security, at the global level, have been affected both in the short term and in the long-term perspective. Both globally and at EU level there have been changes regarding basic commodity prices, produced quantities, exports, and imports. Among the methods of reducing the impact of the war on the agricultural sector, the involvement of the EU and member states was necessary to avoid a possible world crisis by creating corridors of EU-Ukraine solidarity. More

and deeper measures are necessary to ensure a harmonized approach of the problem by the international community. Our recommendations on the subject addressed are built around short-, medium- and long-term actions designed to reduce the pressure this armed conflict or similar ones may entail in the future. An important aspect refers to the necessity of a free movement of exports. Ukraine is an important player in the agricultural sector, being one of the largest cereal producers. If its exports were blocked again, food prices would be affected and the number of people facing poverty would further increase. Furthermore, it is imperative to ensure control in emergency situations such as this Russian invasion of Ukraine or the Covid-19 pandemic for that matter. In such situations, it is important that citizens do not panic and buy food even if they do not need it, because this leads to reduced food accessibility or reduced food availability. Out of fear, they tend to buy food impulsively to ensure that they will not run out of it, but through these actions, themselves they lead the agri-food sector towards these problems encountered exacerbating the pressure on the market fundamentals – supply and demand – and its capacity to self-regulate. From another perspective, it is important to focus on stimulating the interest for the agricultural sector. Attracting young people to this line of work is necessary considering that at the EU level grain production has decreased and in Ukraine the number of farmers has decreased due to military conscription.

An imperative aspect to consider, even though more challenging to implement especially in a globalized world market, is represented by the necessity of decreasing the dependence on imports from other countries. The war revealed several problems, including the dependence of some countries on imports from the main global producers. It is important that countries dependent on imports identify other alternatives so that in case of similar shocks, they avoid the manifestation of severe food insecurity problems. From a similar point of view, targeting the need to reduce dependences on external supplies and increasing the domestic production of fertilizers is also recommended. Russia is the largest producer of fertilizers and due to their current price rises, the production of cereals in the EU has been largely affected.

Consequently, through the energy and food supply challenges it sparked, the Russian-Ukrainian war created new food insecurity problems and intensified the vulnerabilities of the global food system already affected by the Covid-19 pandemic and the recent powerful climate-change induced natural events. The progress towards reaching sustainable development and food security goals of the previous decade has been shattered by the current threats and their impact on all dimensions of food security. The problems are exacerbated by the fact that, momentarily, no

signs of war ceasing may be seen. The dependencies brought to fore by this conflict opened the eyes of the global community over the necessity to make some profound changes in the way the food security aspect is handled. A stronger focus on thinking and developing key actions and measures implementable in belligerent situations is imperative for any nation worldwide, but for the moment, protecting the most vulnerable and making sure human basic needs are met and respected is the top priority for a solidary international community.

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