

The Impact of the Ukraine-Russia War on Food Security and Countries Exposed to Food Supply Shock

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ABSTRACT

Ukraine and Russia together are called the “Breadbasket of Europe” and are the important producers of agricultural commodities. Russia’s invasion on Ukraine has affected the food supply chains and forced manufactures to reshape their supply chain strategies as consumer behavior not only in the specific region but also far away from the conflict zone has changed dramatically. This war has direct and indirect economic exposures globally, disruption of global supply chains, global growth prospects, pressure on exchange rates, spikes in food and fuel prices worldwide, security challenges and macroeconomic instability.

Keywords: Conflict Zone, Challenges, Disruption, Invasion, Instability, Ukraine-Russia.

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I. INTRODUCTION

Agricultural trade today, is over 1.1 trillion \$ and expected to grow even more, making it more complex and interconnected. Every single country in the world is somehow dependent on international trade to pace the overall food needs to a greater or lesser extent. Global trade of food commodities has multiple benefits, in terms of efficient food production, access to food that can be produce efficiently and cheaply, especially seasonal fruits and vegetables. It makes sense for a country to seek the benefits of competitive advantage, to grow the things that are best suited for the production and export them and on a contrary import what they are not growing seeking the advantages of comparative advantage. That is often known as Central tenant of Economic theory. This is one of the significant ways to deal with inefficiencies and higher prices. Thus globalization leads to price reduction and efficiencies. Food trade, over the last few decades is both growing and changing. The global demand for dairy products and meat is continuously increasing. Major portion of meat and dairy products is associated with livestock feed including soya, concentrated feed and fodder crops. Approximately, one third of the total world’s calories intake diverted to animal feed surpassing over 100 billion \$ in 2018 (Global Organic Food & Drink Market Trends & Outlook).

World population, particularly in developing countries is increasing rapidly and this increasing population density would cause more demand for meat, dairy and use of grains in livestock feed to more than double. These concerns lead to multiple questions. For example, if it is possible to increase the capacity of food production to double in next few decades? And what would be impacts on earth? Also Impacts

on nonagricultural ecosystems of the world. Current agricultural practices are deliberately simplified, nutrient rich state ecosystems. To match the local growing conditions, and maximize crop yields, it is very important to carefully select crop plant varieties. Water, phosphate, and minerals like nitrogen should be supplied in excess to increasing soil fertility and pesticides are very important as pests (weeds, insects, and pathogens) are controlled actively. And doubling of agricultural productivity will have significant environmental challenges such as greenhouse gases emissions. Furthermore, ongoing Ukraine-Russia War and tensions between NATO countries and effects on supply chains in Europe are really crucial. USA/China trade tensions and consequences of Ukraine-Russia war and Covid-19 ongoing situation since last three years have significant impact on global food trade (Chepeliev *et al.*, 2022).

Ukraine and Russia together are called the “Breadbasket of Europe” and are the important producers of agricultural commodities such as sunflower seeds and cottonseed oil, Wheat, barley, maize and fertilizers. Even before the war, many countries around the world did not have access to adequate food supplies because of economic downturn triggered by the Pandemic and travel restrictions of Covid-19. According to United Nations report in 2021, between 720-811 million people around the world were affected and went hungry because of covid-19 and due to this ongoing Russia-Ukraine war situation will be even worse in 2022.

This ongoing conflict has sent numerous shockwaves to global economy. Commodity prices, including energy, fertilizers, and food commodities have witnessed increasing uncertainty and supply disruptions (Bachmann *et al.*, 2022). Furthermore, sanctions, trade restrictions, and limiting trade activities with Russia will cause serious economic impacts on Russian banks, foreign exchange rates, trade activities,

businesses and individuals (Berner *et al.*, 2022). Also, this ongoing conflict has sparked an enormous refugee crisis, at the moment, four million Ukrainians fleeing from their country approximately. This situation will lead to cause greater uncertainty and unrest in neighboring countries and create financial crisis in Ukraine (Anayi *et al.*, 2022). Household's income in Ukraine has fallen and poverty rate is rising because of social unrest, destruction of infrastructure, reduced or no economic activities and access to basic necessities of life. Most of the countries are still recovering from the post-pandemic situation and Ukrainian economy is in great danger with forced migration, loss of income, deaths of household heads (such as parents), and rising prices of basic food commodities (Ivan Yotzov *et al.*, 2022). According to United Nations, more than 6500 civilians had lost their lives so far, approximately, 6.5 million people are forced to displace internally, and more than four million Ukrainians had left their country. The Ukrainian government has lost \$570 billion (approximately) and counting as conflict is not over yet.

Table I marks the overall ranking of food production of major food commodities of the world. Which indicates that both Ukraine and Russia are major producers of cereals and fertilizers. Russia's invasion on Ukraine has affected the food supply chains and forced manufactures to reshape their supply chain strategies as consumer behavior not only in the specific region but also far away from the conflict zone has changed dramatically.

The distribution of the food, in the most effected war zones has been sharply impacted, with closed factories, reduced operating capacity, upended logistics, limited supply connections between suppliers and retail stores (Fig. 1). Food manufacturing firms in Ukraine are facing the unwanted task of moving their businesses to safer places for the safety of employees and their effort to maintain necessary level of Production.

TABLE I: RANKING OF WORLD PRODUCTION OF MAJOR FOOD CROPS (2020)

Commodity	Russia Rank	Ukraine Rank
Sunflower Seed or Cottonseed oil	2 nd	1 st
Wheat and Meslin	4 th	7 th
Barley	2 nd	6 th
Maize	10 th	6 th
Fertilizers	4 th	18 th
Fuel	3 rd	N/a

Source: World Integrated Trade Solution, WITS (2022).

Doctor John Rich says: "The safety and security of our workers and their families are of utmost concern, where necessary and possible, we are ensuring their relocation to safe areas and will provide financial support as necessary."

Ukraine holds the world's largest sunflower oil producer followed by the Russian Federation, and together they both share more than half of the exports of sunflower oil. This region also produces 26% of the total global exports of wheat, making them the largest exporters of wheat in the world. Nearly every single continent depends on Russian-Ukraine for either wheat or sunflower oil. In 2018, the European countries were among the top importers of sunflower oil produced by this region, followed by the Southeast Asian countries and Middle East Asia.

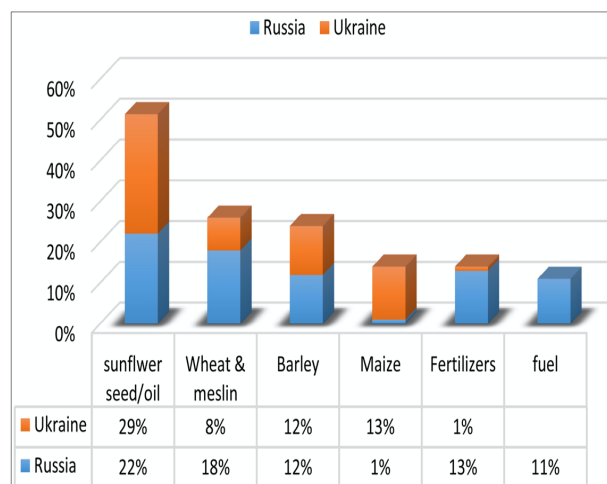


Fig. 1. Share of worlds total exports (major food-related commodities 2020).

II. THE SYSTEMIC IMPACTS OF THE WAR IN UKRAINE: A TRIPLE SHOCK

The economic spillover effects of Ukraine-Russia war will be experienced worldwide, as both countries are the major suppliers of cereals, gas, fertilizers, sunflower oil and seeds. Russia and Ukraine account for 2% of the global trade and world GDP together. There has been noticed a sharp increase in prices of cereals, fuel, fertilizers, metal products, and energy prices. Raga and Pettinotti assumed that if the prices of food commodities, fuel, and metal products increase 10% roughly, there will be sever negative effects on lower and middle-income countries and force them to pay \$18 billion (inflation effects) as war impacts supply chains of these products and situation will be worse for the Middle East, North Africa, and sub-Saharan African countries relying heavily on Russia and Ukraine for the supply of food commodities. Raga and Pettinotti measured the direct economic impact or exposure to (Ukraine and Russia war) on lower and middle-income countries by using several indicators.

The economic impacts of the war are disrupted trade, increasing prices of food commodities, cross-border financial transactions, outward investment, and economic sanctions have direct economic exposure to Russia and Ukraine. At first, bilateral exposures such as Bilateral trade, foreign direct investment (FDI) in both countries, trade agreements, imports and exports of goods and services, logistical operations, financial flows, and commodity prices and forced internal and external migration (especially in Ukraine) will challenge multiple economic challenges for the region. Secondly, this war has indirectly economic exposures globally, disruption of global supply chains, global growth prospects, negative effects on debt, pressure on exchange rates, spikes in food and fuel prices worldwide, security challenges and macroeconomic instability.

The OECD predicts that global economic growth in the next year will be at least 1% lower than projected and inflation rate will be higher than 2.5% than expected.

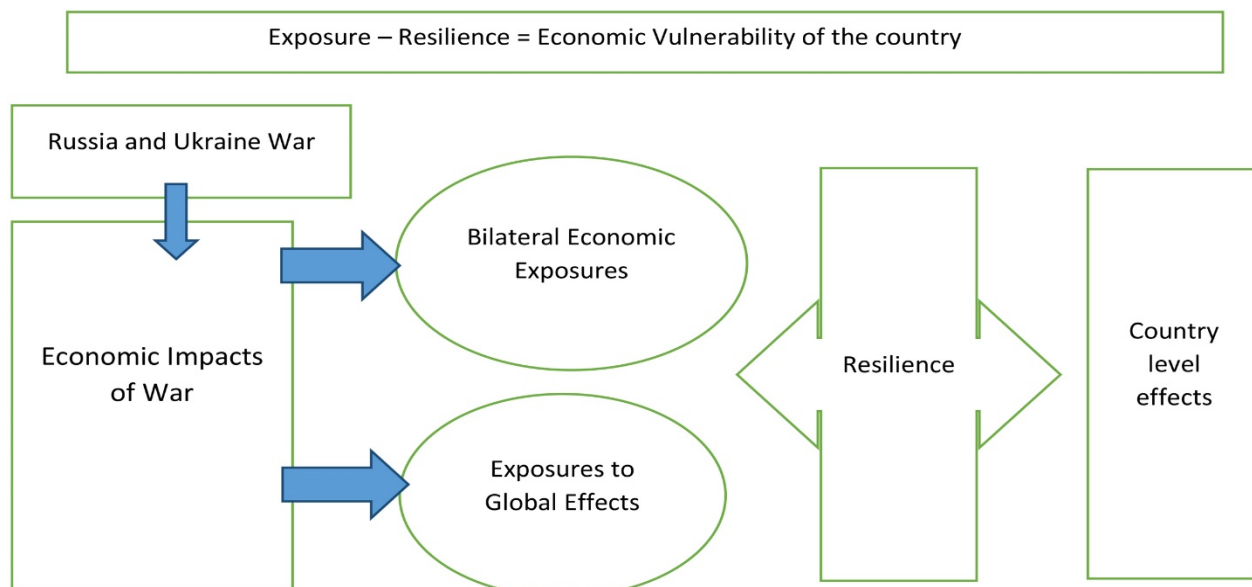


Fig. 2. Economic Impacts of Ukraine-Russia war.

Belarus, Lebanon, Kyrgyzstan, Armenia, Tajikistan and Uzbekistan are the most effected countries of the war as they are heavily depending on (complete reliance on commodity imports, tourism, energy related investments, and remittances) and these two countries geo-graphically and historically (Sara Pantuliano, 2022).

III. THE IMPACT OF UKRAINE-RUSSIA WAR ON FOOD SECURITY

The ongoing conflict between Russia and Ukraine is threatening the availability of different food commodities in those countries that heavily rely on this region. According to the Food and Agriculture Organization of the UN (FAO), Lebanon, Libya, Egypt, Oman, Yemen, Saudi Arabia, Jordan, Morocco, Tunisia, and Iran are heavily relying on Ukraine and Russia. As soon as the conflict start in February 2022, the

commodity market flattered, and sunflower oil price shot up from 470.50 US\$ to 1480 US\$ per metric ton in early March to 1950.50 US\$ per metric ton in Early April (Zachmann & Weil, 2022). Similarly, Wheat Prices increased approximately 12% and expected to grow even more in near future. The food industry, around the globe is highly disrupted as the Black Sea became the critical trading route for agricultural products. This ongoing war and is threatening the availability of edible oil, wheat, fertilizers and other food commodities in countries that heavily relying on different food exports from Ukraine and Russia. Experts around the world, believe that the ongoing Ukrainian conflict is affecting the upcoming harvesting cycle as Russian forces are bombarding major ports, infrastructure, grain storage silos and their aggression is continuing to rise. Stricter sanctions on Russian traders and supply chains and limiting trading routes of Black Sea and Sea of Azov will further worsen the situation of food trading (Benton, 2020).

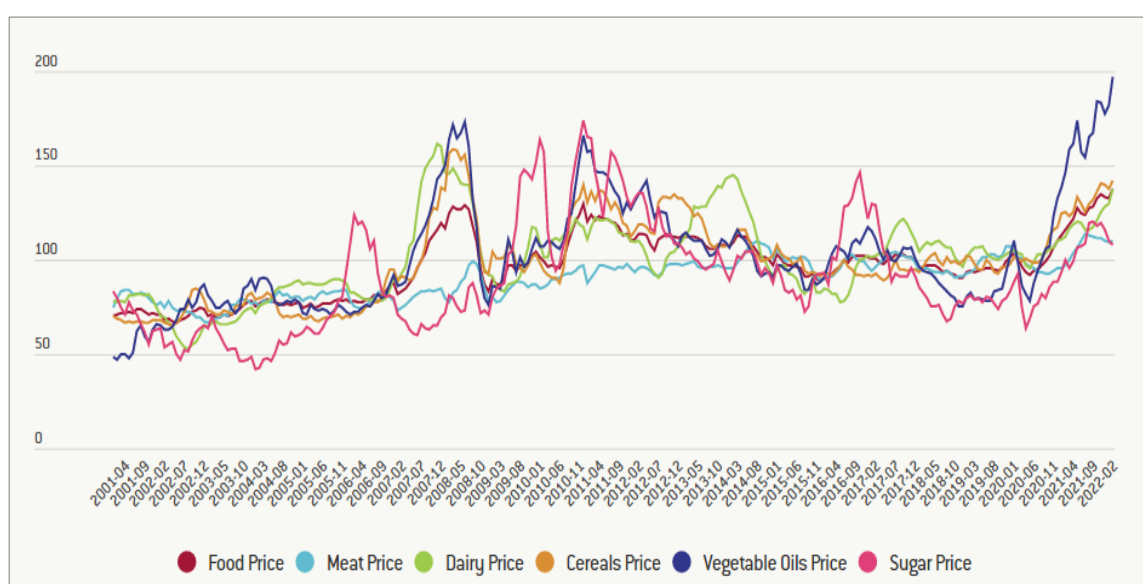


Fig. 3. Food Prices Indexes (monthly basis).

Source: Bruegel based on FAO Food Price Index (FFPI).

Note: trade-weighted average of food commodity prices spanning the main markets for cereals, vegetable oils, sugar, meat and dairy products. Weights are according to export shares in the period 2014-16, the base period considered the most representative for most markets in the past ten years: meat (33%), cereals (29%), oils (17%), dairy (14%), sugar (7%). Real is deflated by the World Bank’s Manufactures Unit Value Index.

Russian and Ukraine are among the world’s largest exporters of cereals, fertilizers, and sunflower oil. Harvests in Ukraine are much lower in 2022 as expected and blockade of Ukraine’s black seaports means that there will be very limited trade activities because of insecurity and higher insurance rates. This will further affect trade activities in the region as most of the captains are refusing to enter in black sea. This will also affect Russia’s ability to export its harvests as well. After March 2022, there has been seen significant increase of prices of grains and fertilizers on world markets. Prices of maize, soybeans, and wheat has increased 75% to 85% as compared to prices in September 2021. Urea fertilizer, potash prices have been increased more than 50% as compared to last year and they are expected to grow even more.

FAO Food Price Index (FFPI), in Fig. 3 shows that prices of different food commodities like cereals, vegetable oils, sugar, meat, and dairy related products are continuously increasing over the last few years. If we analyze the prices of these commodities, meat prices have been increased 33% in the last 10 years, followed by the Cereals (29%), vegetable oils (17%), Dairy (14%) and Sugar (7%).

IV. THE IMPACT OF AGRICULTURE COMMODITIES

Global food market is stressed as demand for food is high while supply side has been restricted. And it is becoming expensive which means higher food prices and rising food insecurity. Ukraine holds one of the top positions as a major exporter of Wheat, Barley, and Sunflower oil (Fig. 4), which depicts that there will be a serious impact on commodity prices (Best, 2022). The conflict has already soared the prices of oil and gas as well, promising yet another squeeze on energy costs in Europe after Covid-19 impacts on businesses and hardly recovered supply chains, international logistics, and retailers from Pandemic. Most of the food companies in Ukraine are now in the third round of negotiations with suppliers and retailers for the fourth wave of price increase which will further affect consumer’s behavior on food expenditures. Ukraine is the global leader in sunflower oil exports with 3.8 billion dollars’ exports annually, followed by the Russia (\$1.7 billion), and Netherlands (\$388.79 million) (Fig. 5).

The above-mentioned graphs (Fig. 4 and Fig. 5) clearly depict the reliance of European and many other countries of the world on Russia and Ukraine for the availability of different food commodities. And this ongoing situation will lead to scarcity of food and rising prices not only within the conflict zone but also elsewhere in the world. Global food market is stressed as demand for food is high while supply side has been restricted. And it is becoming expensive which means higher food prices and rising food insecurity.

The Food and Agriculture Organization (FAO), in their report stressed that food prices have been rising since January. The food price index is 24.1% higher in England compared to the last year this time and similar rising trends have been experienced elsewhere in the world. Rising food prices can reduce the real incomes of the households, and it may push people into food poverty trap. In most of the developing countries larger portion of the people’s disposal income is spent on food commodities.

For example, on average a household in Nigeria spends 56.4% of its disposal income on food, compared to 8.2% in UK. Ukraine and Russia play an important role for the global trade of commodities like barley, sunflower oil, maize and sunflower seeds.

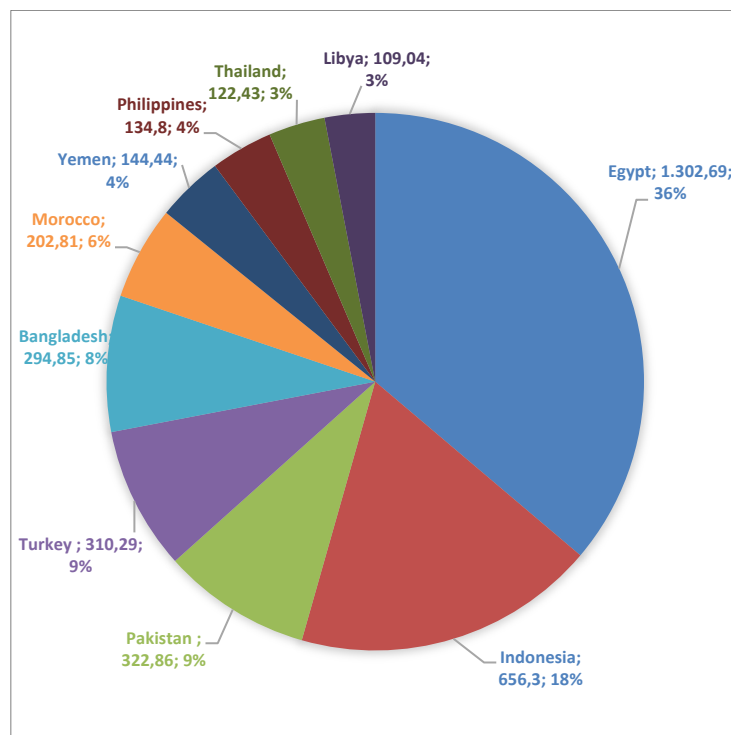


Fig. 4. Top ten importers of wheat from Ukraine (Values in \$ Million, 2020) Source: Resource Trade

Country	Exports
Ukraine	3.8bn
Russia	1.73bn
Netherlands	388.79m
Argentina	334.5m
Bulgaria	239.42m

Fig. 5. Top Five Sunflower Oil Exporters (UnComtrade 2020).

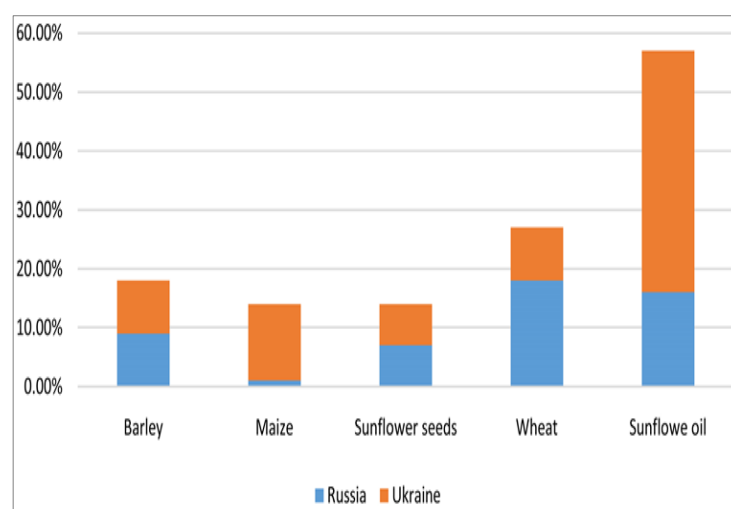


Fig. 6. Share of global markets by volume (Ukraine and Russia) 2018-2020.

Ukraine has seen a significant growth over the last few years of exporting wheat and barley. In 2021, Ukrainian share of exporting barley and wheat increased by 14% and 10% respectively. While Russian share of exports these commodities has increased 12% (barley), and 18% of Wheat. Russia is often considered as breadbasket to the many countries in Middle East, North America and European countries. Particularly, Middle East countries like Egypt, Jordan, Yemen, Israel, and Lebanon are highly dependent on imports from Ukraine and Russia to sustain daily cereal consumption. Yemen and Lebanon are most at risk as they import their cereals (barley, Wheat, Maize) 31% and 47% respectively from Russia and Ukraine. According to UN-COMTRADE data Libya imports 55% of its cereal consumptions from Ukraine and Russia. Armenia is highly dependent on imports from this region and imports 92% of its cereal consumption from Ukraine and Russia, followed by the Georgia (85%) and Azerbaijan with a share of 77% of cereal

imports from these two countries. Prices of the fertilizers were already very high even before the conflict started because of global financial crisis and higher gas prices.

In September 2021, China imposed strict restrictions on exports of phosphate and ammonia. Russia is the global leader for the exports of fertilizers, followed by China, Canada, USA and Belarus respectively. Russia and Belarus together share 20% of the global supply of fertilizer and Russia announced and stopped exports to non-friendly countries. As production of fertilizers is highly energy-intensive process, especially, ammonia consumes 2 % of the global energy consumption. Disruption of global supply chains of fertilizers will have major consequences on crop yields and income of the short farm holders. European Union has already put sanctions on exporting Potash from Belarus and Russia decided not to export to non-friendly countries. In this situation the prices of food commodities will be increased in Europe, and it will have multiplier effect.

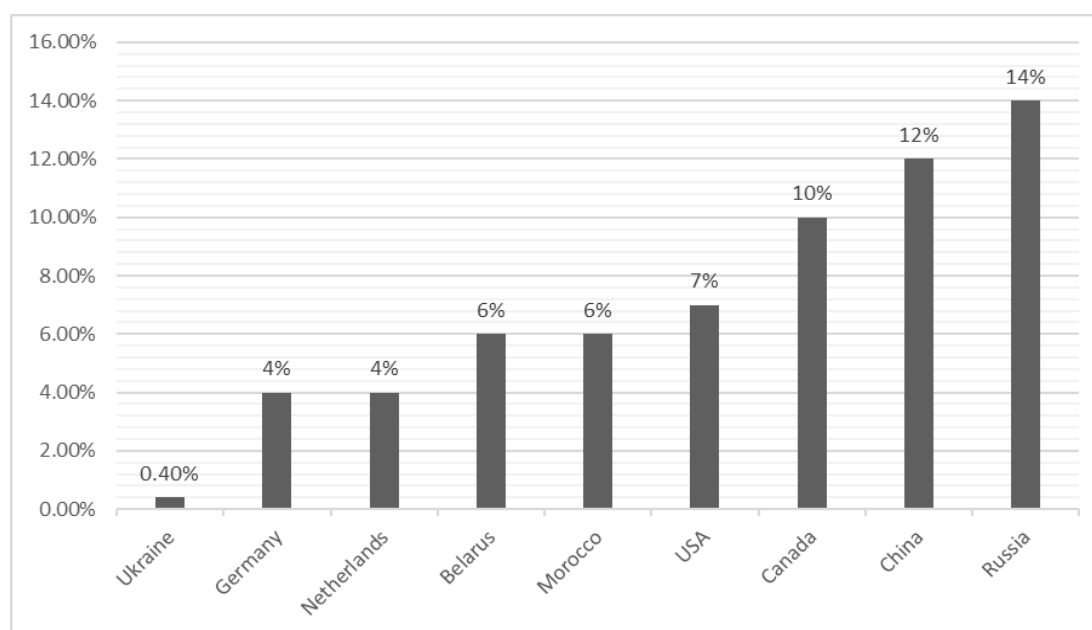


Fig. 7. Top fertilizers exporting countries.

TABLE II: 20 COUNTRIES MOST EXPOSED TO THE FOOD SUPPLY SHOCK

Country	Import dependency ratio	Share of RU + UA in Total cereal Import	Shortfall	
			Scenario 1	Scenario 2
Armenia	53.3	91.5	9.5	23.8
Israel	97.0	37.2	9.4	19.8
Sudan	23.6	88.5	9.3	23.3
Georgia	62.9	84.7	8.6	22.1
Azerbaijan	30.6	77.4	7.8	20.5
Spain	37.4	22.5	7.3	16.1
Indonesia	10.1	24.1	7.0	15.8
Netherlands	85.1	21.3	7.0	15.6
Tanzania	3.9	51.2	6.1	16.5
Mongolia	36.5	61.2	6.1	17.2
China	4.2	18.8	6.1	14.2
Portugal	74.4	17.3	5.7	13.6
Yemen	96.0	31.2	5.6	14.4
Morocco	56.9	19.7	5.5	13.5
Uganda	5.2	33.5	5.4	14.3
Tunisia	65.5	47.0	14.5	27.2
Belarus	2.9	73.1	11.5	25.3
Lebanon	99.0	46.9	11.4	23.1
Egypt	48.2	58.7	11.3	23.8
Turkey	.8	67.9	10.1	22.9

V. CONCLUSION

The ongoing conflict between Russia and Ukraine is threatening the availability of different food commodities in those countries that heavily rely on this region. As soon as the conflict start in February 2022, the commodity market flattered, and higher prices will keep going in the coming months. Global inflation is continuously surging challenging humanitarian needs and geo-political tensions. Ukraine and Russia together are called the “Breadbasket of Europe” and are the important producers of agricultural commodities such as sunflower seeds and cottonseed oil, Wheat, barley, maize and fertilizers. Even before the war, many countries around the world did not have access to adequate food supplies because of economic downturn triggered by the Pandemic and travel restrictions of Covid-19. Experts around the world, believe that the Ukrainian conflict had affected the harvesting cycle as Russian forces had bombarded major ports, infrastructure, grain storage silos. Stricter sanctions on Russian traders and supply chains and limiting trading routes of Black Sea and Sea of Azov had further worsened the situation.

CONFLICT OF INTEREST

The author declares no conflicts of interest regarding the publication of this paper.

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