

THE IMPACT OF THE RUSSIAN-UKRAINIAN WAR ON GLOBAL FOOD PRODUCTION



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Abstract: This study examines the impact of the conflict between Russia and Ukraine on global food production. Russia and Ukraine play key roles in global food production, and many countries depend on the food exports of these two nations. However, this war has posed a significant threat to global food production as it negatively affected food supplies and doubled the challenges facing countries, especially the poorer ones. The war disrupted food production in Ukraine, weakened global supply chains and food trade, causing food shortages and rising food prices in global markets. This led to increased levels of hunger and malnutrition worldwide. To protect global food security, it has become the responsibility of countries and international organizations to work together to enhance international cooperation and take effective measures to address the effects of this war and promote the sustainability of food production globally.

Keywords: Food production, food supply, Russia, Ukraine, food security

تأثير الحرب الروسية الأوكرانية على إنتاج الغذاء العالمي

ملخص: تبحث هذه الدراسة في تأثير النزاع بين روسيا وأوكرانيا على إنتاج الغذاء العالمي، إذ تلعب روسيا وأوكرانيا أدواراً أساسية في إنتاج الأغذية على المستوى العالمي، وتعتمد العديد من الدول على الصادرات الغذائية لهذين البلدين، غير أن هذه الحرب شكلت تهديداً كبيراً على إنتاج الغذاء العالمي، حيث أثرت سلباً على الإمدادات الغذائية وضاعفت من التحديات التي تواجهها الدول خاصة الفقيرة منها، حيث عطلت الحرب إنتاج الغذاء في أوكرانيا، وأضعفت سلاسل الإمداد العالمية وتجارة المواد الغذائية، مما تسبب في نقص الغذاء وزيادة أسعار المواد الغذائية في الأسواق العالمية، الأمر الذي أدى إلى زيادة مستويات الجوع وسوء التغذية عالمياً، ومن أجل حماية الأمن الغذائي العالمي، أصبح على عاتق الدول والمنظمات الدولية مسؤولية العمل سوية لتعزيز التعاون الدولي واتخاذ إجراءات فعالة للتصدي لتأثيرات هذه الحرب وتعزيز استدامة إنتاج الغذاء على المستوى العالمي.

الكلمات المفتاحية: إنتاج الغذاء، إمدادات الغذاء، روسيا، أوكرانيا، الأمن الغذائي.



L'IMPACT DE LA GUERRE RUSSO-UKRAINIENNE SUR LA PRODUCTION ALIMENTAIRE MONDIALE

Résumé: Cette étude examine l'impact du conflit entre la Russie et l'Ukraine sur la production alimentaire mondiale. La Russie et l'Ukraine jouent un rôle clé dans la production alimentaire à l'échelle mondiale, et de nombreux pays dépendent de leurs exportations alimentaires. Toutefois, cette guerre a constitué une menace majeure pour la production alimentaire mondiale, en affectant négativement les approvisionnements alimentaires et en aggravant les défis auxquels font face les pays, notamment les plus pauvres. En effet, le conflit a perturbé la production alimentaire en Ukraine, affaibli les chaînes d'approvisionnement mondiales et le commerce des denrées alimentaires, entraînant ainsi des pénuries et une hausse des prix des produits alimentaires sur les marchés internationaux. Cela a conduit à une augmentation des niveaux de faim et de malnutrition dans le monde. Pour préserver la sécurité alimentaire mondiale, les États et les organisations internationales ont la responsabilité de coopérer afin de renforcer la collaboration internationale et de prendre des mesures efficaces pour faire face aux répercussions de cette guerre et promouvoir la durabilité de la production alimentaire à l'échelle mondiale.

Mots-clés: production alimentaire, approvisionnements alimentaires, Russie, Ukraine, sécurité alimentaire.



Introduction

The United Nations Sustainable Development Goals (SDGs) included ending world hunger by 2030. Despite the decline in global hunger rates over the past fifty years due to increased global food production, this increase has recently been negatively affected by numerous factors that impacted productivity, food availability, and supply. Among the most critical factors are climate change—which has become drier—leading to agricultural land drought, water scarcity, and increased desertification; rising oil, raw material, and fertilizer prices essential for agricultural goods production; in addition to political unrest and armed conflicts that affected agricultural operations in their respective countries, and global trade policies and competition among major powers.

Among the most influential crises affecting global food production today is the Russian-Ukrainian war, given that both countries are among the main suppliers relied upon by food-importing nations. This war has impacted global food production due to the fluctuation and decline in food output from both countries, in addition to the inability to market the available products. This creates a major source of uncertainty for global food markets and the ability of all countries to secure their current and future food needs.

Given the importance of global food production in the context of the Russian-Ukrainian war, this study aims to address the following problem:

To what extent has the Russian-Ukrainian war affected global food production? And what are the main strategies for addressing it?

This issue raises several sub-questions:

- What do we mean by global food production? What are its challenges?
- What is the global significance of Russian and Ukrainian food products?
- What are the implications of the Russian-Ukrainian war on global food production?
- What are the key strategies adopted by countries to confront food shortages caused by the Russian-Ukrainian war?

To answer the central issue, the following hypothesis is formulated:

If Russia and Ukraine play a pivotal role in global food production, then this war will significantly affect these production processes, necessitating the adoption of alternative strategies to confront the global food shortage.

In this study, we relied on the descriptive method as the main approach to describe the state of food production before and during the Russian-Ukrainian war, in addition to auxiliary approaches such as the statistical method by incorporating and



analyzing many statistics. We also used the historical method and the case study method—namely, the case of the Russian-Ukrainian war.

THE FIRST TOPIC:

The Conceptual Framework of the Study

In this section, we attempt to establish a conceptual framework for global food production, identify the main influencing factors, and outline the most important global food-producing countries.

First requirement: The Concept of Global Food Production

The term *food production* refers to a complex process through which various food materials are produced, processed, and traded. This process encompasses several dimensions, including agricultural production, climate changes, animal husbandry, fair trade, safety and health, and economic sustainability. This aspect of the global food system is considered very important, as it affects people's lives, and likewise impacts the profits and returns of institutions and the well-being of the planet¹.

Many researchers in the field of food production classify it into several areas and types, including crop cultivation, crop management, crop harvesting, crop production, crop preservation, horticulture, slaughtering, fermentation, pickling, beverage and confectionery production, restaurants, and more.

Global food production does not only involve farming and harvesting; it extends to the process of cultivating, harvesting, and distributing food on a global scale. It involves various agricultural practices that today benefit greatly from technological advancement, including the mechanization and digitization of production processes. It also includes economic dynamics that determine how food is cultivated, processed, and consumed globally. Global food production is largely linked to the efficiency of food production methods, which play a crucial role in meeting the global demand for food.

According to the Food and Agriculture Organization (FAO), the agricultural and food system represents the path that food takes—from being planted and grown on the farm to being safely consumed at the table. The food system includes all processes that food undergoes—from cultivation, harvesting, processing, packaging, transport, distribution, trading, purchasing, preparation, consumption, and disposal. Since food is also linked to the natural and human environment, the food system also includes non-food products (such as forests, biofuels, fertilizers, pesticides...) and all

¹ Nina Veflen, Diána Bánáti, Food Production, 2023, consulted on 25/04/2025, at 20:00, <https://www.sciencedirect.com>.



the people engaged in agricultural activities, investing in them, and contributing to the availability of these agricultural and food products.¹

Second requirement: Factors Affecting Global Food Production

There are several factors that influence global food production. These factors vary based on their causes, and in this section, we address the most important of these factors in some detail.

Section one: Environmental Sustainability

The natural environment is the habitat of global food. Food is cultivated within natural agricultural lands, which requires the availability of arable land rich in natural nutrients. Therefore, preserving the natural environment is essential for maintaining healthy and sound food production.

Environmental sustainability is based on the necessity of maintaining a balance between the environment, the economy, and society—meaning achieving a balance between the natural resources the environment provides (whether directly consumable or transformable) and the resources required by economic production processes without depleting them, as well as what humans need to meet their daily consumption needs. Since the environment is the primary source of any food product, environmental sustainability requires the rational exploitation of environmental resources in a way that meets the needs of current generations while preserving the rights of future generations.

In this area, global food production faces major challenges related to environmental sustainability, including large-scale deforestation, soil erosion and loss of fertility, depletion of groundwater and waste of surface water, excessive use of pesticides, unregulated and illegal fishing. The reliance on intensive farming practices leads to habitat destruction, loss of biodiversity, and conversion of natural ecosystems into agricultural lands. Excessive use of chemical fertilizers and pesticides negatively affects soil fertility, leading to reduced yields and water source pollution. These negative practices pose significant challenges to global food production, global food security, and the ecological system in the medium and long term.

Section two: Global Trade Policies

Global food production is linked to global demand. There is a direct relationship between the quantity of production and the level of demand for food. In this context, global trade policies represent a major challenge for farmers' access to global markets and the pricing of their food products. They significantly impact local food

¹ Food and Agriculture Organization, World Food Day 2021, published on October 16, 2021, consulted on April 25, 2025, at 14:00, <https://madr.gov.dz>.



production systems, which remain heavily influenced by laws and trade agreements—whether they provide facilitation or impose restrictions on producers and farmers.

These laws and agreements may offer encouraging trade conditions and support local farmers with wider markets for their products. However, they may not protect them from competition with larger and more productive international producers. This can increase pressure on small farmers and affect their production capacity, thus impacting the sustainability of local food systems as long as profit-seeking dominates.

For example, between 2020 and 2021, food prices rose dramatically. The trade war between the United States and China was a contributing factor, as high tariffs were imposed on imported food products in both countries during that trade conflict. As a result, consumers were forced to bear the cost of increased import tariffs in the form of higher food prices.

Section three : Climate Change

Climate change affects agricultural yields from food products. Among its key effects are:

- Global warming, which increases temperatures by approximately 0.2°C every 10 years
- Irregular rainfall patterns by region and time period, which creates inconsistency in food product volumes
- Droughts, which even developed countries cannot control

This irregularity in temperature and rainfall, along with increased drought, causes small farmers to face major difficulties in their agricultural activities. This impacts global food availability and raises prices.¹

Due to increasing water scarcity in global farming systems, more than half of the world's food production is expected to be at risk of failure within the next 25 years, according to the October 2024 report by the Global Commission on the Economics of Water. Experts also warn of the severe negative impacts of environmental degradation and failure to protect ecosystems and freshwater resources on food systems and global food security.

In this context, experts expect that demand for freshwater will exceed supply by 40% by the end of the decade. This is due to the direct relationship between rising temperatures and atmospheric humidity. Research indicates that each 1°C increase in Earth's temperature adds 7% humidity to the atmosphere, exacerbating the hydrological cycle and leading to more severe weather events. Thus, it is expected that the world will face a deep food and water crisis in the next quarter-century unless

¹ BBC, Factors affecting food supply, consulted on 20/04/2025, at 11:00, <https://www.bbc.co.uk>.



globally coordinated actions are taken. The future demands collective global efforts to protect vital resources.¹

Section four : COVID-19 Pandemic

The COVID-19 pandemic had a major impact on global food production. Farmers, like other workers globally, saw a decline in activity, resulting in decreased food production. The pandemic was thus a key factor in the rise in food prices in 2020 and 2021. It also affected the movement of goods in domestic and international markets due to lockdown policies adopted by most countries at the time. The supply of food commodities no longer matched demand, leading to higher food prices, reduced incomes, lower purchasing power, disrupted food security indicators, and an increase in the number of people suffering from malnutrition. The global supply chain was also disrupted.²

Due to lockdown policies and restrictions imposed on farmers during the pandemic, food supplies decreased significantly in many countries. Farmers were unable to sell their products, access market information, or find food. These restrictions disrupted agricultural activity due to labor shortages and disrupted global food distribution networks. Global food production declined significantly, and some widely consumed food items became scarce.

Section five : Technological Developments

Advanced technological methods are now used across all fields, including food production. Technology plays a significant and precise role in determining production methods, transportation, and distribution—especially on a global scale. Today, developed countries use advanced mechanization and smart machines in global food production. This increases crop yields, improves quality, and reduces labor costs.

In agricultural technology, many smart innovations are used that boost farmers' productivity in less time. For example, techniques like climate-smart agriculture, integrated water management, genetically modified organisms (GMOs), precision agriculture, and sustainable agriculture are employed. These automated practices allow farmers to produce more food more efficiently while using fewer resources.

Through these smart technologies, farmers can monitor crop health, improve water use, and apply fertilizers more effectively, thereby enhancing overall productivity on a global scale.

¹ Youm7, Warning: Half of the world's food production is at risk of failure due to water scarcity, published on October 21, 2024, consulted on April 28, 2025, at 11:00, <https://www.youm7.com>.

² Muh Amat Nasir, Agus Dwi Nugroho, and Zoltan Lakner, Impact of the Russian–Ukrainian Conflict on Global Food Crops, consulted on 20/04/2025, at 11:30, <https://www.mdpi.com>.



Advanced countries now use high-tech combined harvesters, invest in smart irrigation systems for vast areas, and build road networks to improve logistics. By investing in agricultural technology, these countries have made various forms of farming and livestock breeding possible in areas previously unsuitable for such activities. However, in contrast, third-world countries cannot afford these technologies, which limits the productivity of their agriculture.¹

Section six: Pests and Diseases and water Stress

Agricultural crops and livestock are exposed to many pests and diseases that cause farmers significant losses, potentially leading to bankruptcy and abandonment of farming altogether. The farmer's first priority is to secure his own needs and then sell any surplus. For example, crops may be attacked by pests such as rats and mice that consume them, or by parasites and larvae that damage or reduce the yield. Livestock can also be affected by diseases like foot-and-mouth disease and bovine pleuropneumonia, which may lead to their death. To combat these problems, countries vary in their capabilities. Developed countries use advanced medications, have highly trained veterinarians, and apply pesticides and agricultural chemicals to their crops. In contrast, poor countries cannot afford these due to high costs.²

On the other hand, water stress occurs when the demand for water exceeds available supply during a specific period, or when poor water quality limits its usability. It significantly affects food production. Without usable water, farmers cannot irrigate their crops, leading to soil and crop drought, and thus reduced food output. Countries that receive adequate rainfall throughout the year face no irrigation issues. However, those experiencing droughts—especially due to climate change—resort to using irrigation systems in drier areas to increase crop yields, which makes it difficult for them to afford these systems.³

Section seven: Wars and food waste

Armed conflicts affect farmers and crops. They force farmers to flee their lands located in conflict zones and seek refuge in peaceful areas where they do not own land and cannot engage in agricultural activities. Wars also destroy vast areas of farmland and kill many animals. Food may be used as a weapon by cutting off supplies to gain ground. Armed conflicts and wars disrupt supply chains and reduce the affected regions' capacity to maintain hygienic conditions for food production. Consequently, global food production is negatively impacted.

In addition, Many countries with food surpluses dispose of excess food without selling or donating it to nations in need. This is known as food waste. The United States, the United Kingdom, and China are among the highest food-wasting

¹ BBC, Op.Cit.

² Food – Factors affecting food supply, consulted on 20/04/2025, at 12:00, <https://www.coolgeography.co.uk>.

³ Ibid.



countries. According to a UN study conducted in 2021, the U.S. wastes approximately 21.3 million tons of food annually, the U.K. wastes over 5.7 million tons, and China wastes more than 100 million tons per year. Estimates show that in 2019, global food waste exceeded one billion tons.

Third requirement: Concepts Related to Food Production

The concept of food production still heavily overlaps with a set of related or similar concepts, making it difficult for researchers to reach a unified and appropriate definition. Among these concepts are:

Section one: Food Gap

The food gap is defined as the difference between the amount a country produces domestically and what it needs to meet its food requirements. It is measured by the difference between the total food needs of consumers and the food products produced and available locally in the country. There is a direct relationship between the size of the food gap and the difficulty of providing food—the larger the food gap, the more difficult it is to provide basic food for local consumption, which affects the national economy. In this case, imports serve as an alternative to bridge the food gap.

Section two: Food Self-Sufficiency

Food self-sufficiency is a country's ability to provide the basic food needs for all its population by allocating available agricultural resources to produce food materials, measured by the country's ability to provide adequate food for its citizens through national production without relying on external sources and attempting to avoid imports. It is a concept with more political than economic dimensions.¹

Food self-sufficiency ensures the country's food independence, making it capable of producing sufficient quantities to meet the consumption needs of its citizens. Thus, it avoids pressure from food-exporting countries and the conditions and restrictions they impose on importing countries. Where food self-sufficiency is achieved, the food gap disappears.

Section three: Food Safety

Food safety means ensuring the safety and health of food so that it is suitable for consumption without any harm. It focuses on the conditions and standards necessary to guarantee food safety and health for consumers. It includes all stages of food production, manufacturing, storage, distribution, and preparation processes to ensure its safety, health, and suitability for human consumption.

¹ Kebaïli Abdelnour, Daghmoum Hicham, "Assessment of Food Security in Algeria According to Specialized Global Indicators During the Period (2014–2020)", *Afaq Journal for Sciences*, Vol. 7, No. 2022, p. 677



In this field, food safety examines the impact of agricultural additives on crops, as well as the safety of foods and their freedom from chemical elements used to protect agricultural food products from bacterial diseases and pests. It also includes anything that may reduce the nutritional value of agricultural food products and make them harmful instead of healthy and beneficial.

Section four: Food Insecurity

Food insecurity occurs when individuals are unable to access sufficient quantities of safe, nutritious, and healthy food that ensures proper and sound growth. The causes of food insecurity vary—it may result from the unavailability of food, weak purchasing power of individuals, unfair food distribution, poor use of food, or lack of constant food availability. Food insecurity and its continuation lead to serious cases of malnutrition. It can be chronic, seasonal, or temporary.¹

Fourth Requirement: The Top Global Food-Producing Countries

Section one: United States of America

Statistics show that the USA topped the global agricultural production rankings in 2024, with 513.7 million tons produced that year. Its main agricultural products include corn and sorghum. Agriculture is a vital economic sector, contributing \$100 billion to the U.S. economy. In 2020, it ranked third, with corn, soybeans, dairy, wheat, and sugarcane among the top five agricultural commodities by value. The U.S. was by far the largest global agricultural exporter in 2020, with exports valued at \$147.9 billion. In 2021, this value rose to a record \$177 billion, driven by a 25% increase in exports to China, reaching \$33 billion. Crop yields and production continued to rise despite a significant decline in cultivated land over recent decades.²

Section two: China

China ranks second globally in agricultural production in 2024, making it one of the top producers of crops, with 230.4 million tons of agricultural output that year. China supplies half the world's vegetables. In 2020, the total value of its agricultural production was around \$1.56 trillion, including \$1.5 trillion in food products. Despite having only 10% of the world's arable land, China produces a quarter of the world's grain and leads in the production of grains, cotton, fruits, vegetables, meat, poultry, eggs, and fish products, according to the FAO.

Despite the growth in China's agricultural production, it shifted from complete self-sufficiency in food production in 2000 to relying on imports for over 23% of its food

¹ Ibid., p. 676

² Al-Araby Al-Jadeed, Four countries are the largest food producers in the world: Get to know them, published on August 10, 2022, consulted on 21-04-2025, at 15:00, <https://www.alaraby.co.uk>.



needs by 2020 due to declining soybean production, increased grain imports, ongoing loss of farmland, and industrial and urban development.¹

Section three: Brazil, Argentina and India

Brazil ranked third globally in 2024 with total agricultural production estimated at 230.4 million tons. It is a major producer of sugar, coffee, and orange juice, with large areas of unused farmland. In 2020, Brazil ranked fourth in global agricultural output with \$135.8 billion in production, including \$125.3 billion in food products. Its \$85.2 billion in agricultural exports ranked third after the U.S. and the Netherlands.

As for Argentina ranked fourth globally in 2024 with 120.6 million tons of agricultural production. Its main agricultural products are soybeans, wheat, and meat, making it a key supplier to meet global demand.

India ranked fifth globally in 2024 in terms of agricultural output, with 88.9 million tons produced. Its primary crops are rice, wheat, and legumes. Agriculture plays a central role in the Indian economy, with agricultural output reaching \$403.5 billion in 2020, including \$382.2 billion in food products.

THE SECOND TOPIC:

The Role of Russia and Ukraine in Global Food Production

First requirement: Importance of Russian and Ukrainian Food Products

Russian and Ukrainian agricultural lands are characterized by high fertility and are known as black soil, which makes their productivity high compared to agricultural lands in other countries. This feature has made Russia and Ukraine among the most important food producers in the world, especially in the production of wheat, corn, and barley. It is expected that by 2030, their productivity will reach about 64% of global production (267 million tons).

Russia ranked eighth in the world in wheat production in 2022, with an expected production of 5.3 million metric tons of soybeans. At the same time, Ukraine ranked tenth, with an expected production of 2.3 million metric tons of soybeans in the same year.

Russian and Ukrainian wheat exports are concentrated in several countries in Europe, Asia, and Africa. More than 30 net wheat-importing countries in North Africa and West and Central Asia rely on both countries. Additionally, low-income countries suffering from food deficits depend on the two countries' exports to meet over 30% of their wheat import needs.

Russia and Ukraine are also major players in international trade. Russia contributes significantly, especially in energy and food markets and many raw

¹ Ibid.



materials. Russia is a key supplier of fertilizers and nutrients (nitrogen, phosphate, and potassium). Ukraine holds weight in grain and oilseed markets and is among the top six exporters of corn, chicken, and honey. About 10% of its GDP comes from shipping millions of tons annually through the Black Sea. It is one of the few countries in the world that exports large quantities of domestically produced food to many countries. Additionally, both are among the world's leading suppliers of wheat and sunflower oil. Russia's total exports to the world reached USD 491.06 billion in 2020, while Ukraine's exports reached USD 49.04 billion, with grains accounting for 19% in 2021.

During the period (2016–2020), Russia ranked second (7.5% of global exports) in grain exports after the United States (17.6%), while Ukraine ranked third (7.1%). Thus, the two countries play a key role in global food production and supply.

As for wheat exports, being the most important food product, Russia is considered the largest exporter in the world, with Ukraine occupying the second place. The two countries together accounted for 30% of global wheat exports during the period (2016–2021), and they export 32% of barley and 18% of corn. As for the production and export of oilseeds, their combined exports amounted to 77% during the same period.¹

In addition to these food products, the two countries produce other food crops, the most important of which are sugar beets, potatoes, tomatoes, meat, and chicken.

Second requirement: The State of Food Production in Russia and Ukraine Before the War

The year 2000 marked the beginning of a transformation in agricultural production in Russia and Ukraine, where many improvements were introduced to the agricultural practices in place at the time, following the restructuring of farms in the 1990s, which had positive results in increasing agricultural productivity. This coincided with the recovery of both the Russian and Ukrainian economies from the financial crisis of the late 1990s, leading to expanded investments in the agricultural sector. As a result, wheat productivity in both countries continuously doubled, and corn crops showed even greater growth, rising in Ukraine by 4.4% annually over the past twenty years, while in Russia it increased by 5.5% annually.

Despite these positive results, grain production in Russia and Ukraine faced several problems over the past two decades that affected crop yields and prevented them from reaching their maximum productivity. These problems were mainly due to climate changes and their negative impact on crops, as well as lower yields compared to European Union levels, limited access to credit and financing, and the lack of clarity in regulatory frameworks governing the agricultural sector. This made it very

¹ International Grains Council, 2022.



difficult to use fertilizers and pesticides to protect crops, leading to reduced agricultural investments.¹

At the beginning of the second decade of the 21st century, agricultural production began to gradually recover. From 2012 to 2022, Russian and Ukrainian grain exports increased, with Russia's annual wheat exports increasing by 10.0% per year and Ukraine's by 11.3%—high rates compared to the global production increase over the same period, which was estimated at only 2.3% annually. Additionally, corn exports from Russia and Ukraine increased by 7.6% and 6.5% annually, respectively, during the same decade.

The expansion of Russian and Ukrainian agricultural production over the past two decades made them key players in global markets, with their food exports rising and their international markets expanding. Many food-deficit countries became dependent on food exports from both countries. In 2013, Ukraine and Russia accounted for 50% of Egypt's wheat imports, rising to more than 76% by 2021.

Indonesia imported more than 8% of its wheat needs from the two countries in 2013, reaching 27% in 2021. Despite significant agricultural production in the European Union, Ukraine accounted for more than 55% of the EU's corn imports, compared to less than 5% before the mid-2000s. Ukraine also accounted for more than 40% of China's corn imports during the period (2020–2023), importing more than 80% of its corn needs from Ukraine amid its trade war with the United States.²

Between 2019 and 2021, Russia and Ukraine accounted for 12% of global agricultural trade based on kilocalories, with a joint market share of 34% for wheat, 26% for barley, 17% for corn, and 75% for sunflower oil.

THE THIRD TOPIC:

The Impacts of the Russian-Ukrainian War on Global Food Production and Response Strategies

Global food production was affected by the Russian-Ukrainian war, and these effects became clearly visible immediately after the war began, continuing to the time of writing this text. Therefore, many countries have sought to find solutions and alternatives to address these effects. We explain this in the following points:

First requirement: Impacts of the Russian-Ukrainian War on Global Food Production

The Russian-Ukrainian war had negative impacts on global food production, which can be summarized in the following points:

¹ Joseph Glauber, David Laborde, and Johan Swinnen, The Russia–Ukraine war's impact on global food markets: A historical perspective, published April 6, 2023, (consulted on 20/04/2025, at 20:00), <https://www.ifpri.org>.

² Ibid.



Section one: Decline in Food Production Levels

The war affected food production and supplies, leading to shortages in food products—especially wheat, corn, and sunflower oil—in some countries that rely on imports from Russia and Ukraine to meet their needs. In Ukraine, the war disrupted production as farmers faced difficulties tending to their fields, harvesting crops, and marketing them. Farmers were unable to harvest winter crops in vast areas estimated between 20% and 30% (about 1.9 million hectares) of the cultivated land during the 2022–2023 agricultural season. Farmers also faced great difficulty in securing the fertilizers needed to combat pests and diseases affecting crops and animals, suffered from labor shortages, and lacked storage infrastructure. Key agricultural areas in Ukraine—such as Donetsk, Kherson, and Kharkiv—suffered significant crop losses.

The impact of this war is not limited to the present; it may continue for several years after the war ends. According to the International Monetary Fund, recovery from these effects may take a long time due to the extensive damage to agricultural infrastructure, the military occupation of farmlands, farmers abandoning their land in conflict zones, and displacement to safer areas. This affects future agricultural productivity and pressures local and global food markets.¹

Section two: Increased Cost of Food Production

The war led to higher food production costs, as farmers struggled to obtain raw materials for food production, whose prices rose both domestically and globally due to the war. This increased cost was passed on to consumers as higher prices for agricultural and animal food products. Additionally, food distribution incurred extra costs due to increased insurance premiums for ships docking in the Black Sea, which are required to protect food shipments from war damage. This situation affects local markets in both countries and global markets alike. As a result, food production costs rise, farmer incomes decline, and agricultural infrastructure in Russia and Ukraine is negatively affected.

Section three: Rising Food Prices

The World Bank's 2024 report titled "*Commodity Markets Outlook*" stated that the war had a significant impact on commodity markets and affected global trade, production, and consumption patterns. The Bank expected that prices would remain historically high through the end of 2024.

In March 2022, one month after the war began, global food prices rose sharply and unprecedentedly. The following table illustrates this:²

Table 3: Percentage Increase in Global Prices of Some Agricultural Products

¹ Lotanna Emediegwu Update, How is the war in Ukraine affecting global food prices?, (consulted on 19/04/2025), at 14:00, <https://www.economicsobservatory.com>.

² Muh Amat Nasir, Agus Dwi Nugroho, and Zoltan Lakner, Op.Cit.



Product	March 2022	April 2022	May 2022
Soybeans	8.91%	0.03%	0.46%
Corn	14.66%	3.77%	0.95%
Wheat	24.53%	1.85%	5.45%

Source: Prepared by the researcher based on data from the reference: Muh Amat Nasir, Agus Dwi Nugroho and Zoltan Lakner, Impact of the Russian–Ukrainian Conflict on Global Food Crops, (consulted on 20/04/2025, at 11:30), <https://www.mdpi.com>.

As for grains, they recorded a relative increase in January 2023 estimated at (0.1%) compared to December 2022, with an average of 147.4 points in January 2023, an increase of 6.7 points (4.8%) compared to the same time the previous year. The FAO Cereal Price Index peaked at 173.5 points in May 2022, an increase of 32.9 points from January 2022. For meat, the FAO Meat Price Index peaked at 125.9 points in June 2022, an increase of 13.8 points from January 2022.¹

There are many negative effects resulting from the global rise in food prices. These effects are especially evident in low-income countries, which faced a significant increase in their import bills in 2022 and 2023 due to the sudden surge in food and fertilizer prices caused by the war. This led to food price inflation in most of these countries. An IMF research report estimated that about 48 countries were most vulnerable to food shortages due to increased food import bills and pressure on their trade balances and foreign currency reserves, leading to the erosion of those reserves.

The rise in Russian fertilizer prices and global energy prices due to the war contributed to the increase in global food prices. Ukrainian grain and oilseed prices were also affected. Agricultural production suffered due to its heavy dependence on fertilizers and energy, which became inaccessible in global markets during the war—or if available, were very expensive, making procurement a burden on importing countries.²

In March 2025, the average FAO Food Price Index stood at 127.1 points, remaining almost unchanged from its level in February. Declines in the cereal and sugar price indices offset increases in meat and vegetable oil prices, while the dairy price index remained stable. Overall, the FAO Food Price Index recorded an increase

¹ Ghada Khadawi, Key Drivers: The Food Crisis After the First Year in Ukraine, published on 25-03-2023, (consulted on 16-04-2025, at 14:00), <https://ecss.com.eg>.

² Energy and Finance Systems, Global impact of war in Ukraine on food, published April 13, 2022, (consulted on 15/04/2025, at 20:00), <https://news.un.org>.



of 8.2 points (6.9%) compared to the same time the previous year, but remained below its peak of 33.1 points (20.7%) in March 2022.¹

The average FAO Cereal Price Index reached 109.7 points in March 2025, a decrease of 2.9 points (2.6 percent) from its level in February of the same year and 1.2 points (1.1 percent) below its value recorded in March 2024. The average FAO Vegetable Oil Price Index reached 161.8 points in March 2025, an increase of 5.8 points (3.7 percent) from month to month, and remained significantly higher than its level one year ago (23.9 percent). The continued increase in the index was driven by rising prices of palm oil, soybean oil, rapeseed oil, and sunflower oil. The average FAO Meat Price Index reached 118.0 points in March 2025, an increase of 1.0 point (0.9 percent) from its value in February of the same year, and 3.1 points (2.7 percent) above its level a year ago. The FAO Dairy Price Index stood at 148.7 points in March 2025, unchanged compared to February 2025, but remained 24.6 points (19.9 percent) higher than its value one year ago. The average FAO Sugar Price Index reached 116.9 points in March 2025, a decrease of 1.6 points (1.4 percent) from February of the same year and 16.5 points (12.3 percent) below its level one year before this date.

Section four: Rising fertilizer prices

Natural gas is one of the main components in fertilizer production, and Russia is considered the world's most important producer. This caused a significant rise in its prices on global energy markets during the Russian-Ukrainian war. Consequently, fertilizer prices also saw a substantial increase. As shown in the food price index above, food prices reached their peak in March 2022, marking an increase of 24.1 points compared to January 2022, before the war began.

Russia and Ukraine are among the top producers of potash-based agricultural nutrients, and the war sharply raised their costs. This contributed to the continued rise in global food prices because using less fertilizer leads to lower crop yields while farming costs increase.²

Section five: Weak supply and distribution chains

Ukraine produces large quantities of agricultural products, more than half of which are exported. Over 90% of these exports, before the war, were shipped through various Black Sea and Azov ports. Currently, access to these ports has become impossible due to the war, forcing reliance on alternative export channels such as roads, railways, and river ports, which can only handle about 20% of the usual

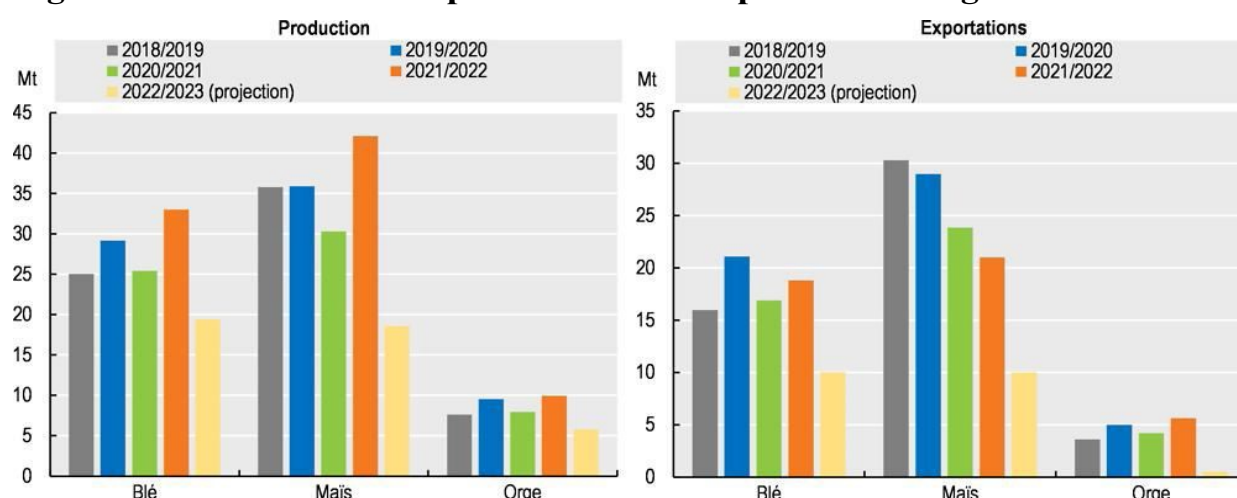
¹ Shamsan Awad Al-Tamimi, The Russian–Ukrainian War and Food Security in Africa: Implications and Opportunities, published on October 4, 2023, (consulted on 20-04-2025, at 15:00), <https://studies.aljazeera.net>.

² Andrew Stanley, "The War Ignites a Food Crisis," Finance & Development Magazine, International Monetary Fund, published June 2022, (consulted on 16-04-2025, at 14:30), <https://www.imf.org>.

volumes. This highlights the urgent need to expand the capacity of alternative export routes and find new outlets.¹

The war has already led to the closure of Ukraine's main port (Odesa), and agricultural food export activities have declined, if not completely halted. If the war continues, it may damage storage facilities, seaports, and domestic transport infrastructure in Ukraine. Several countries have already imposed food export bans—reaching 19 countries as of 7 December 2022—and eight countries in 2022 adopted export restriction measures. These exceptional actions significantly impacted global food supplies and left millions at risk of famine.

Figure 1: Shows Ukraine's production and exports of main grains.



Source: Qirsh Ben Salem, “The Problem of Food Security During Crises: The Russian-Ukrainian War as a Model”, Journal of Law and Human Sciences, Vol. 17, No. 4, 2024, p. 129.

On the other hand, Russian agricultural exports were also affected, as more restrictions were imposed on its exports of grains, sugar, and some nitrogen fertilizers. This led to a decline in their global supply and directly impacted global trade flows, contributing to the rise in food prices.

Section six: Rising levels of hunger

The Russian-Ukrainian war has increased the number of individuals threatened by hunger and malnutrition. Many international organizations have warned that this war could lead to food insecurity, especially in poor countries, and may result in conflicts and violence in other regions. This is due to the rise in global food prices. The Food and Agriculture Organization (FAO) estimated an increase of 11 million people at risk of hunger. The number of people suffering from malnutrition could rise by 8 to 13 million during the 2022–2023 period. It is also expected that about 600 million people will suffer from chronic malnutrition by 2030 if the war continues.

¹ Qirsh Ben Salem, “The Problem of Food Security During Crises: The Russian–Ukrainian War as a Model”, Journal of Law and Human Sciences, Vol. 17, No. 4, 2024, p. 128.



These increases will be unevenly distributed across several regions, with Africa being the most affected—an increase of about 23 million people—followed by Asia and the Pacific, and the Near East. This is in addition to the significant human losses in Mariupol, Kherson, and Kharkiv, and the expansion of the human cost of the war.¹

As a result of increased hunger and malnutrition, future health problems will arise, such as stunting in children, declining quality of life, increased mortality rates, and the spread of malnutrition-related diseases like severe anemia, reduced physical and mental capabilities. This will hinder the achievement of the sustainable development goals related to food security. Therefore, the world today must seriously, firmly, and effectively address these negative impacts of the Russian-Ukrainian war, as they may develop into political unrest.

Section seven: The inability of other food producers to compensate for the global food shortage

The decline in agricultural production in Russia and Ukraine, and the shortage of agricultural supplies in global markets due to the war, created a mismatch between global supply and demand for food products, especially agricultural ones. Global food-producing countries were unable to compensate for this shortage. For example, Canada produces enormous amounts of global food, but it did not offset the decline in exports from Russia and Ukraine. Agricultural production in Brazil and Argentina was also affected by climate changes, especially drought. This increased the gap between supply and demand for global food.

Second requirement: Strategies for Addressing the Decline in Global Food Production

Some countries have taken measures to address the issue of declining global food production and increase resilience, including:

Section one: Increasing agricultural production

Some countries have worked to increase their agricultural output to reduce dependence on imports to meet local demand. They adopted several strategies, such as expanding winter wheat cultivation in Northern Hemisphere countries. For example, the United States, a leading winter wheat producer, expanded its cultivated areas for 2023—the largest in eight years—with an 11% year-on-year increase. Other countries expanded arable land and reclaimed new areas to boost crop productivity.

Section two: Reducing global grain consumption

Most countries that relied on food imports from Russia and Ukraine moved to reduce their grain consumption. As a result, global grain consumption declined, especially in the 2022–2023 period, which saw a contraction estimated at 19 million

¹ Lotanna Emediegwu Update, Op.Cit.



tons (0.7%) compared to 2021–2022. This decline was due to weak global supply chains for food products and the global price hikes caused by the Russian-Ukrainian war.

Section three: Reducing food loss

Food waste poses a significant challenge to achieving global food security, with large amounts of food going to waste without being used. Food-producing countries often dispose of surpluses to maintain global prices at levels that secure them significant financial gains. Meanwhile, the number of people at risk of hunger and malnutrition continues to rise. Therefore, reducing food loss is a key strategy for ensuring food access to these people and ensuring food security. The average food loss is estimated at about 14% of global food annually, equivalent to \$400 billion immediately post-harvest. Additionally, 17% of food—about 931 million tons—is wasted at retail and consumer levels. Thus, reducing food loss and waste represents a "triple-win" opportunity for climate, food security, and the sustainability of our food systems, and should be a top priority during times of increasing food insecurity, malnutrition, and hunger worldwide.

Section four: Encouraging and supporting local agriculture

Some countries with uncultivated land have encouraged farmers to plant these arable lands and reclaim barren lands by providing them with financial support, agricultural equipment, and interest-free or low-interest loans. Other countries bought agricultural products directly from farmers in exchange for incentives. In some cases, governments encouraged farmers to diversify their crops to include those previously imported, while other countries-imposed export tariffs on domestically produced foods¹. These measures will help ensure local food needs are met and reduce the negative effects of fluctuations in global food production and supply.

Section five: Increasing import source diversification

Relying on a single country to meet food needs poses a threat to domestic food security. This was evident in the Russian-Ukrainian war, where countries heavily dependent on imports from both countries were greatly affected. Therefore, the strategy of diversifying import sources represents one of the solutions in such cases. Some countries have moved to diversify their food import sources to include countries such as Brazil, Argentina, and India as alternatives to Russian and Ukrainian exports.

Conclusion

Global food production plays a vital role for both food-producing and food-importing countries. It is affected by several factors—some natural, mainly linked to climate change and its consequences, and others related to human activity, such as

¹ AON, The Russia–Ukraine Conflict Will Have a Major and Long-Lasting Impact on Global Food Supply, published April 27, 2022, (consulted on 15/04/2025, at 20:00), <https://www.aon.com>.



trade policies, technological developments, and wars and conflicts. This study has demonstrated the severe and negative impact of the Russian-Ukrainian war on global food production, prompting many countries to adopt alternative strategies to address these effects.

Through this study, we arrived at several findings, including:

- Global food production is currently influenced by many negative factors, especially climate change, conflicts and wars, global trade policies, international commercial competition, and more.
- The Russian-Ukrainian war has negatively impacted global food production by disrupting global food supplies due to the closure of Ukrainian Black Sea ports and sanctions that limited Russia's export capabilities. Additionally, farmers abandoned agricultural lands in Ukraine due to the war. Prices reached record highs due to the disruption in the flow of essential goods from two of the world's largest exporters of wheat and basic consumer goods.
- The war's impact was not limited to the involved parties but extended to the global economy, raising the costs of essential goods, increasing inflation, eroding individual purchasing power, and disrupting supply chains, which made access to essential materials more difficult, increased production costs, and affected various food industries—thus intensifying food insecurity and malnutrition.

Based on these results, we can make the following recommendations:

- Governments must show political will to support the agricultural sector by increasing public spending directed toward this vital sector to achieve local, self-sufficient food production capable of resilience within a comprehensive food sovereignty framework.
- All food-importing countries should prioritize land use and achieving food sovereignty now and in the future to avoid the repercussions of global crises such as the Russia-Ukraine war.
- Development partners must disseminate available agricultural innovations and establish active links between research institutions and those involved in humanitarian and development aid, while regularly consulting reports from the Agricultural Market Information System (AMIS) and the International Food Policy Research Institute (IFPRI) to strengthen resilience in such crises.
- Diversify sources of food imports and promote sustainable local agriculture to ensure the continuity of food supplies and achieve sustainable food security—something that requires peace and stability.
- Efforts should also focus on combating food waste to reduce losses during harvesting, transportation, distribution, and consumption. This requires improving storage facilities, transport infrastructure, and logistics services.



- To increase agricultural production in food-importing countries, it is necessary to create a safe and business-friendly environment and enact laws and policies that allow for direct foreign investment in the agricultural sector to establish a path toward self-sufficiency in essential food production.

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