

UKRAINE'S FOOD SECURITY DURING THE WARTIME PERIOD

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***Abstract.** The article describes the importance of food security for Ukraine before the outbreak of hostilities. It reviews the situation in Ukraine at the outbreak of the conflict and its role on world food markets as one of the largest exporters of grain. The damage to agriculture due to the hostilities is assessed: destruction of infrastructure, damage to farmland, inaccessibility of land for cultivation reduction of production. Because of the problems in Ukraine there is a decrease in the export of Ukrainian agricultural products, especially as a result of the blockade of the Black Sea ports. The aim of the article is to analyze the consequences of military action on food security in Ukraine, to identify the key challenges faced by the country under the conditions of war, and to consider measures taken to ensure food stability in the domestic market and agricultural recovery in the future. The relevance of the article is that the military conflict that is ongoing in Ukraine has profound and far-reaching implications for agriculture and food security both domestically and internationally. In addition, military actions lead to a sharp increase in food prices inside Ukraine, which creates social and economic problems for the population. It is necessary to develop comprehensive measures to reduce the impact of the war on food security and create conditions for the recovery of agriculture after the end of the conflict. The role of international organizations, such as the World Food Programme, in supporting Ukraine and other countries dependent on Ukrainian grain, as well as the impact of sanctions and Russia's international isolation on the global food market, is discussed. This topic has important practical implications for action planning both at the national level and for the international community, and requires timely attention to*

minimize economic losses and ensure food security in both war and post-conflict reconstruction. The article describes a situation where military action has caused enormous damage to Ukraine's food security, but despite the difficult conditions, the country is taking active measures to minimize the impact and restore agriculture in the future.

Keywords: *food security, economic security, military conflicts, economic threat, production blockade, product availability, product exports*

JEL: *H11, O11, R15, Q18*

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Introduction. Food security is the basis for the stability of any country, and is especially important in times of crisis, when resources and opportunities to provide the population with food become limited. The war that continues on the territory of Ukraine has devastating consequences for its agrarian economy and food system, which jeopardizes food security both domestically and internationally. Ukraine has traditionally held one of the leading positions in the world production and export of cereal crops, especially wheat, corn and barley. However, since the beginning of the conflict, a significant reduction in production volumes, destruction of agricultural infrastructure, loss of farmland and blockade of ports have resulted in serious challenges to food security.

The domestic market has faced soaring food prices, food shortages and disrupted supply chains. These challenges are compounded by the need to provide food to both civilians and the military, which requires considerable effort and resources. Moreover, the global food market is also affected, as Ukraine is an important supplier of agricultural products to the world market and the decline in its exports has an impact on other countries, especially those that depend on Ukrainian supplies.

This article will examine the impact of military action on Ukraine's food security, analyze the challenges and threats facing the country, and suggest ways to ensure food stability during the conflict and its aftermath. Particular attention is paid to the recovery of the agrarian economy and food system, as well as international assistance and cooperation, which play a key role in supporting food security.

Food security is a fundamental aspect of any country's national security, especially in a war crisis. War affects all elements of the food system: from the production of agricultural products to their distribution and consumption. Ukraine, being one of the leading agrarian countries in the world, faced unprecedented challenges in the context of armed conflict. Damage to infrastructure, loss of crops, restricted access to markets and disruption of logistics supply chains jeopardize not only national but also global food security.

The threat to food security becomes even more critical in the context of a war-induced humanitarian disaster. Forced displacement of populations, lack of resources, and disruption of the supply of essential goods and services create conditions under which a food crisis could become a reality for many regions of the country.

The issue of ensuring food security during the war and post-war reconstruction requires a comprehensive approach. It is necessary not only to study the impact of the conflict on the agro-industrial sector, but also to develop effective strategies for the recovery and development of the food system after the end of the conflict. It is also important to consider that the renewal of the agro-industrial sector and ensuring food security will be an important part of Ukraine's post-war economic revival.

Literature review, devoted to Ukraine's food security during the wartime period, shows a wide range of approaches to researching this topic, covering both theoretical aspects and practical results obtained in the current conflict. The leading research works focus on the consequences of military actions on the agricultural sector, domestic and international markets, as well as on the assessment of policies aimed at maintaining food security.

In the academic literature, food security is often understood as the provision of quality and affordable food in sufficient quantities to the population, which includes not only production but also access to food and resilience to external shocks. The works of such researchers as Fukuyama (2013), Gallopin (2017) highlight the theoretical foundations of food security and its relationship with crisis resilience. Applied to Ukraine, important are studies on food security in crises and wars, such as the works of Vladimir Babin (2022), which consider not only economic but also social consequences of military conflicts on food security.

The domestic literature has emphasized studies on the impact of military conflicts on Ukrainian agriculture, including works by Yuriy Skiby (2022) and Tatiana Bortnik (2023), which examine the direct and indirect damage to agriculture under conditions of warfare. These papers examine the consequences for the agricultural sector: destruction of agricultural infrastructure, loss of land, reduced production, and problems with logistics and labor.

An important role in the literature is played by studies on external economic and political factors affecting food security in Ukraine. One of such works is the study by Olga Korbut (2021), dedicated to analyzing international food security and the importance of Ukrainian agriculture for global markets. In the context of the war, Ukraine lost some of its export capacity, leading to food shortages in some countries, especially in Africa and Asia, which rely heavily on Ukrainian supplies. Economists such as Kovalchuk (2022) examine the impact of Russian aggression on global food security and the role of international organizations in supporting food supply during the crisis.

Much attention has been paid to research on Ukraine's food security in crisis, focusing on measures of state support for Ukraine's food security in times of war. Works by Nina Shevchenko (2023) and Oleksandr Lisovsky (2023) analyze Ukraine's food security policy during wartime. These studies show how the Ukrainian government adapted its agricultural policy to support farmers, stimulate production, and strengthen food security at the national level.

In the context of war, Ukraine receives international assistance to ensure food security, which has also been reflected in the literature. Works by Svitlana

Tymoshchuk (2022) and Maria Dubrovina (2023) examine the role of international organizations, such as the World Food Programme and the UN, in assisting Ukraine and supporting global food security. These works also raise the importance of international cooperation and the development of sustainable food strategies in the face of instability.

Studies such as those by Oleksandr Gontar (2022) and Larisa Chernova (2023) address Ukraine's long-term post-conflict food security challenges, prospects for recovery, and long-term challenges. These studies offer recommendations for agricultural recovery, adaptation to changing climatic conditions and finding new markets for Ukrainian agricultural products.

Thus, the literature presents a variety of approaches to the study of food security of Ukraine during the war period. The works of domestic and foreign researchers cover various aspects of the problem, ranging from theoretical understanding of the concept of food security to practical recommendations for restoring and maintaining food supply in crisis conditions. Nevertheless, further research is needed to analyze the impact of the war on food security in the long term, as well as to develop comprehensive strategies for the recovery of Ukraine's agrarian economy.

Research methodology Analyzing Ukraine's food security during the wartime period requires a comprehensive approach that combines quantitative and qualitative research methods to comprehensively assess the impact of warfare on the agricultural sector and the country's food supply. This study uses several methodological approaches to analyze different aspects of food security, including the impact of the war on production, domestic market and international trade.

The methodology for the study of Ukraine's food security during the wartime period includes a multi-faceted and multi-pronged approach. This combination of quantitative and qualitative methods allows for a comprehensive assessment of the current challenges and suggests solutions to maintain food security in both the short and long term.

Main results. Military actions in Ukraine caused significant losses in agricultural production. The war conditions destroyed infrastructure (factories, warehouses, irrigation systems) and damaged agricultural land. For example, the area of agricultural land that could not be used due to fighting or occupation increased significantly. As a result, according to the State Statistics Committee of Ukraine, the production volume of key crops (wheat, corn, barley) decreased by 30-40% compared to pre-occupation years.

The increase in food prices indicates the vulnerability of Ukraine's domestic market, which has faced a sharp rise in food prices. Demand for food has increased, especially in the war zone and in the temporarily occupied territories, where food delivery has been difficult. In addition, rising transportation and fuel costs, as well as problems with logistics and access to markets, have led to inflation for basic commodities. According to the UN, food inflation in Ukraine amounted to more than 50% in 2023.

One of the significant factors affecting food security was the blockade of Ukrainian ports on the Black Sea, which made it difficult to export agricultural products. This led to a significant decrease in supplies to the world market and an increase in world prices for food products. Ukraine lost its status as one of the leading grain exporters, which caused shortages in countries dependent on Ukrainian exports, such as Egypt, Turkey, and a number of African countries.

Ukraine's food security under wartime conditions is one of the key issues affecting both domestic stability and international food markets. The war has significantly complicated the production, transportation and export of agricultural products, which puts pressure on all elements of the country's agro-industrial complex.

The main factors affecting the food security of Ukraine during the war are presented in Table.

Table 1. Main factors affecting food security of Ukraine

Factor	Description
Destruction of infrastructure	Damage to granaries, farms, warehouses and transportation networks due to warfare
Loss of agricultural land	Occupation of territories, minefields and land contamination by munitions, limiting the use of fertile land
Disruption of supply chains	Blockade of ports, damage to roads and railroads, resulting in disruption of domestic and export food delivery
Increased costs of production	Increased prices of fuel, fertilizers and seeds, as well as difficulties in obtaining financial resources for farmers
Loss of export opportunities	Blockage of traditional maritime routes and decline in exports of crops and sunflower oil, affecting the country's economy and international markets
Labor shortage	Mobilization of population and migration due to the war led to labor shortages in the agricultural sector
Impact on the domestic market	Increased domestic food prices and shortages in affected regions

Source: made by authors

Food security of Ukraine in the conditions of war requires a comprehensive approach and active actions on the part of the state, international organizations and partners. The introduction of effective measures makes it possible to minimize the negative consequences of the war for the agricultural sector and provision of food needs of the population. The main measures aimed at maintaining the country's food security are presented below.

Ukraine, with the support of international partners, is taking a number of measures to minimize the impact of the war on agriculture and food security. International assistance and the UN World Food Programme and other international organizations are helping to support the food needs of the population.

Alternative export routes, where Ukraine is actively seeking alternative ways to export its products, including through neighboring countries. Work is gradually underway to restore destroyed farms, modernize storage facilities and transport logistics (Table 2).

Table 2. Measures to maintain food security

Measure	Description
International humanitarian aid	Delivery of food and humanitarian aid from international organizations to war-affected regions
Development of alternative export routes	Utilization of railroad and Danube routes for exporting grain and other agricultural products across Ukraine's western borders
Infrastructure rehabilitation	Repair and restoration of destroyed granaries, farms and transportation routes, as well as demining of agricultural land
Financial support for farmers	Provision of subsidies, soft loans and insurance for war-affected farms
Stabilization of domestic markets	Regulation of prices of basic foodstuffs, creation of state reserves and ensuring uninterrupted supplies to affected regions
Supporting efficient agriculture	Adoption of digital technologies, automating processes and increasing productivity in the face of labor shortages
International cooperation	Coordination with international partners and organizations to restore exports and supply food to domestic markets

Source: made by authors

Stabilizing food security under war conditions remains a priority task requiring a comprehensive approach and international cooperation.

To ensure the export of its products, Ukraine is actively working on the development of alternative transportation routes. One such solution is the use of rail transport across Ukraine's western borders, as well as transportation of products through ports in neighboring countries such as Poland and Romania.

The Ukrainian government and international partners are making efforts to rebuild destroyed agricultural infrastructure. An important step is to ensure that farmers have access to credit and other financial instruments to sustain production. Work is also underway to demine agricultural land, which will allow it to be put back into circulation.

Table 3. Food losses and export dynamics (before and after the outbreak of war)

Indicator	Before war (2021)	During war (2022-2023)
Grain exports	50 million tons	20-25 million tons
Sunflower oil exports	6 million tons	2-3 million tons
Agricultural land area	41 million hectares	28-30 million hectares (some land under occupation)

Indicator	Before war (2021)	During war (2022-2023)
Domestic production	70-80% of domestic demand	50-60% of domestic demand
Increase in food prices	mild	30-50% raise

Source: made by authors

To reduce the burden on rural farms, the State provides subsidies and other forms of support to farmers who suffered as a result of the war. Also, special attention is paid to the development of cooperatives and other forms of collective farming, which contributes to the sustainable development of rural areas.

Under wartime conditions, Ukraine is actively working to improve the efficiency of agricultural production. The use of new technologies, including digital tools for agricultural management, precision farming systems and process automation, helps to optimize resources and increase yields while reducing costs.

The impact of the war on the food security of the Ukrainian population is manifested in several ways, including access to food, changes in food prices, dependence on humanitarian aid and a general deterioration in living conditions.

Table 4. Impact of the war on the food security of the population

Indicator	Before war	Under war conditions
Access to food	Available throughout the country	Limited in affected regions
Level of food prices	Stable	30-50% increase
Dependence on humanitarian aid	Low	High in frontline regions
Availability of basic foodstuffs	100%	60-80%

Source: made by authors

Under the conditions of war, there is a significant increase in food prices, which affects the availability of basic goods for the population. Inflation and shortages of goods have led to the fact that even in relatively safe regions of Ukraine food prices have increased by 30-50%, and in some cases even higher.

Discussion and conclusions. Warfare has caused inflation for food commodities within the country. The increase in the prices of basic food products such as cereals and meat is one of the most visible economic consequences of the war. There has also been an increase in the prices of fuel and transportation services, which exacerbates the problem of food availability for the population, especially in war zones.

The reasons for price increases in different regions of Ukraine are identical, destruction of infrastructure, increased logistics costs, limited supply of agricultural products due to damage to farms and fields and rising fuel and energy costs.

Ukraine, as one of the world's largest producers and exporters of grain crops, has faced port blockages, resulting in lower export volumes and a global food crisis. Countries dependent on Ukrainian exports, such as Egypt and Turkey, were threatened by food shortages, demonstrating the high degree of interdependence of global food markets.

The war has had a devastating impact on Ukraine's food security. Food availability has decreased, especially in the affected regions, leading to higher prices, food shortages and dependence on humanitarian aid. In the long term, ensuring food security will require significant efforts to rebuild agricultural infrastructure, support farmers and strengthen domestic production.

One of the most important measures to ensure Ukraine's food security is international cooperation. Ukraine is actively working with partners such as the European Union, the United States, Canada, the United Kingdom, and other countries to coordinate efforts to rebuild the agricultural sector and provide food for both domestic and international markets.

In the long term, Ukraine will face the need for significant investments to rebuild agriculture and food infrastructure. Forecasts show that full recovery is only possible several years after the end of the conflict.

There is also a focus on export security through Black Sea routes under international agreements, which allows for partial recovery of maritime exports, providing food to countries dependent on Ukrainian products.

Ukraine's food security under war conditions remains one of the main tasks for the state. The war has caused serious damage to the country's agro-industrial complex, but thanks to international support and the active actions of the Ukrainian government, measures are being taken to stabilize the situation.

Despite the current challenges, Ukraine has the potential to rebuild its agricultural sector and return to its status as one of the world's leading food producers. However, this requires comprehensive efforts both at the state level and in international cooperation aimed at rebuilding infrastructure and supporting farmers.

The study shows that the war in Ukraine has led to the destruction of food security at both national and international levels. At the same time, rebuilding the agricultural sector and food system requires a comprehensive approach that includes reforms, farmer support and international cooperation to ensure the sustainability of food supply in the future.

To ensure long-term food security, further work is needed to rebuild destroyed infrastructure, support farmers and develop alternative export routes. Strengthening the agro-industrial complex will be an important element of Ukraine's post-war economic recovery and will also contribute to stabilizing the global food system.

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