

Ukraine as a guarantor of world food security: Challenges on the way to restoring agricultural production potential

Anastasiia Poltorak*

Doctor of Economic Sciences, Professor
Mykolaiv National Agrarian University
54008, 9 Georgiy Gongadze Str., Mykolaiv, Ukraine
<https://orcid.org/0000-0002-9752-9431>

Viktoriiia Stamat

PhD in Economic Sciences, Associate Professor
Mykolaiv National Agrarian University
54008, 9 Georgiy Gongadze Str., Mykolaiv, Ukraine
<https://orcid.org/0000-0001-5789-4023>

Anna Sukhorukova

PhD in Public Administration, Associate Professor
Mykolaiv National Agrarian University
54008, 9 Georgiy Gongadze Str., Mykolaiv, Ukraine
<https://orcid.org/0000-0002-6170-4955>

Anna Burkovska

PhD in Economics
Mykolaiv National Agrarian University
54008, 9 Georgiy Gongadze Str., Mykolaiv, Ukraine
<https://orcid.org/0000-0003-0563-6967>

Vadym Petrenko

Lecturer
Weihestephan-Triesdorf University of Applied Sciences
91746, 16 Markgrafen Str., Weidenbach, Germany
<https://orcid.org/0009-0005-3590-6632>

Abstract. The main objective of this study was to analyse the challenges facing Ukraine in the process of trying to preserve and restore its agricultural production potential, which has been significantly destroyed as a result of hostilities on the territory of the state. The study used bibliometric analysis (using Google Scholar, Scopus Preview and the Bibliometrix package), system-structural analysis and synthesis, as well as historical, dialectical, graphical and descriptive-statistical methods. The study demonstrated that despite the destruction of agricultural production potential, Ukraine remains an important supplier of agricultural products to many import-dependent regions of the world. The article emphasised that world food markets continue to remain unstable, which is confirmed by the Food Price Index, which reached 127.8 points in 2025, demonstrating the vulnerability of food systems to geopolitical shocks. According to experts, as of the first half of 2026, the total losses from the destruction of the

Article's History:

Received: 15.10.2025 Revised: 03.02.2026 Accepted: 31.03.2026 Published: 13.04.2026

Suggested Citation:

Poltorak, A., Stamat, V., Sukhorukova, A., Burkovska, A., & Petrenko, V. (2026). Ukraine as a guarantor of world food security: Challenges on the way to restoring agricultural production potential. *Ukrainian Black Sea Region Agrarian Science*, 30(1), 79-91. doi: 10.56407/bs.agrarian/1.2026.79.

*Corresponding author



Ukrainian economy as a result of the war may reach \$589 billion, of which about \$72 billion will fall on agriculture. It was determined that in the structure of indirect losses of the agricultural sector of Ukraine as a result of the war, the factors that had the greatest impact were the reduction in production productivity, the decline in product prices due to the disruption of exports, and the increase in production costs. It was noted that the potential costs of reconstructing the agricultural sector of Ukraine in the period from 2025 to 2035 could exceed \$55 billion, and the costs of demining could reach almost \$30 billion. It was established that exports of Ukrainian agricultural products to the EU reached almost \$12.8 billion in 2024, which demonstrates the resilience of the agricultural sector of Ukraine and the deepening of integration into European markets. The practical value of the study lies in a comprehensive assessment of Ukraine's agrarian losses caused by the war, an analysis of their global consequences, and the identification of strategic recovery measures

Keywords: impact of war on agriculture; food supply chains; export disruptions; land contamination; rebuilding the agricultural complex

INTRODUCTION

The main challenges to global food security in the world in the 21st century remain wars, natural disasters and geopolitical instability, which lead to disruption of food supply chains, reduced crop productivity or crop losses. The military actions that reached full scale in Ukraine in February 2022 have significantly affected food stability in the world, as Ukraine is one of the largest exporters of agricultural products, including to the most food-insecure regions of the world. As a result of the intensification of hostilities, the area of agricultural land available for farming has decreased, the quality of land has deteriorated due to pollution and explosives, which has a negative impact on the productivity of cultivated crops. In addition, the disruption of the logistics network has led to a slowdown in deliveries or even the blocking of certain export channels. The strengthening of inflationary processes and the growth of production costs have negatively affected the profitability of production. All these factors together undermine the agricultural production potential of Ukraine and require effective ways to solve them.

Studies by the world scientists devoted to the study of food security often consider the war in Ukraine as a deterrent to achieving sustainable development goals and reducing food insecurity. Thus, scientists I. Bulba *et al.* (2024) raised the problem of soil contamination and its degradation as a result of military operations, as well as the prospects for its reclamation and restoration to strengthen agricultural production potential. Researches F. Lin *et al.* (2023) were concerned about the problem of blocking the supply of Ukrainian food to vulnerable regions of Africa, Asia and the Middle East, as the consequences of this could be fatal, provoking famine and social instability. Scientists noted that the lack of Ukrainian food in the world could lead to a serious imbalance in supply chains and pose a threat to food security. The problem of food security disruption

due to the decline in the agricultural production potential of countries around the world was considered by scientists M. Alabi & O. Ngwenyama (2023) not only in the context of such global geopolitical conflicts as wars, but also in the context of the COVID-19 pandemic, which has significantly destabilised the world's economic system, reducing the possibilities of using labor resources, increasing logistics costs and forcing producers to rethink ways to ensure the sustainability of supply chains. Thus, solutions that were aimed at strengthening agricultural production potential during the pandemic can be adapted to solving the problems of post-war restoration of the agricultural sector of Ukraine. In addition, social problems that accompany global crises and may contribute to food security disruption were being addressed by scholars A. Burkovska *et al.* (2022), who proposed ways to balance consumer demand to ensure enhanced food security.

Scientists N. Davydenko *et al.* (2025) in their articles considered ways to strengthen Ukraine's agricultural production potential through the development of technologies, improvement of management methods, revision of the national strategy for ensuring food security, and improvement of the investment climate in the state. These ways were considered as an effective mechanism for influencing the level of food security even in times of global macroeconomic crises. The problem of ensuring food security through strengthening agricultural production potential was considered by scientists A. Poltorak *et al.* (2024) not only at the national, but also at the regional level, which allows paying more attention to individual indicators that form the system's resilience to shocks and economic imbalances. Earlier studies by A. Poltorak (2015) allowed to consider the dynamics of Ukraine's path towards strengthening its agricultural production potential and to identify successful cases that can be effective in the recovery

period after the end of hostilities. The role of local communities in restoring Ukraine's agricultural potential is not left out, as scientists V. Shebanin *et al.* (2024) paid special attention to the challenges facing local communities in the process of finding resources to restore and strengthen agricultural production. Thus, rebuilding infrastructure, restoring soils, and strengthening interaction with state bodies were considered priority tasks of the post-war reconstruction period. Scientists J. Cheng & X. Yu (2024) proposed using cross-sectoral cooperation as a mechanism for revitalising agricultural enterprises and their technological re-equipment during the reconstruction period.

Scientists S. Pimenow *et al.* (2025) have seen great potential in the agricultural sector in supplying raw materials for bioenergy plants, which, if this source of alternative energy was developed, could allow increasing the energy independence of the state, while simultaneously improving the environmental friendliness of the energy sector. Considering experience in the reconstruction of the agricultural production complex after military operations, scientists S. Rieznik & H. Lee (2025) offered the case of South Korea as a successful case of rebuilding rural areas, intensification of agriculture, and establishment of effective cooperation between government bodies at different levels, which ultimately allowed to ensure a high level of food security in the country. Thus, modern scientific research conducted by other scientists emphasised the importance of Ukrainian agricultural production for ensuring world food security, and also considered possible ways to restore agricultural potential in the post-war period. The aim of the study was to analytically prove the importance of Ukraine in the international food market, as well as to analyse the problems that Ukraine faces in the process of preserving and restoring its agricultural production potential, which was significantly undermined as a result of hostilities in the country.

MATERIALS AND METHODS

The methodological basis of this study was designed for a comprehensive analysis of the economic, social and food consequences of the full-scale war in Ukraine and the identification of priority areas for the restoration of the country's agricultural production potential in the context of ensuring global food security. The study was based on an integrated combination of general scientific, analytical and applied economic methods that allow for the assessment of wartime shocks, industry losses and challenges of post-war recovery. General scientific methods were used at all stages of the study, including bibliographic analysis, abstraction, induction and deduction, synthesis and systematisation, which

ensured the coherence and logical sequence of the study. Analytical, statistical and comparative methods were used to assess changes in Ukraine's agricultural production, export indicators and its role in global food supply chains in the context of military conflict.

Dynamic analysis of key indicators within time series was specifically applied to study changes in agricultural exports, food price indices and economic losses for the period from 2000 to 2025, with a special focus on wartime and the period after 2022. The analysis focused on the following key indicators such as value and physical volume of Ukraine's agricultural exports; export value to the EU-27 and selected food-import-dependent countries; FAO Food Price Index (FFPI); estimated direct and indirect economic losses of Ukraine's agricultural sector; recovery and reconstruction needs by sector, etc. This allowed to identify structural gaps and ways to restore Ukrainian agri-food exports. To assess structural breaks and trend shifts, the study applied autoregressive integrated moving average (ARIMA) modelling for short-term trend identification. In addition, spatial and cross-country comparative analysis was conducted at the level of individual countries and regions to assess the dependence of food-stressed states on Ukrainian grain supplies and to compare the scale of losses and recovery needs across sectors of the economy. The comparative sample included countries such as Albania, Finland, Kyrgyzstan, Congo, Tanzania, Tunisia, Egypt, Turkey, Pakistan, Moldova, Somalia, Rwanda, North Korea, Georgia, Laos, Azerbaijan, Kazakhstan, Benin, Mongolia and Armenia. The countries were selected according to high share (over 10%) of wheat and meslin imports originating from Ukraine and/or Russia. To investigate causal relationships, a descriptive-analytical approach was used to interpret the causal relationships between military actions, land degradation, agricultural disruption, export restrictions, and fluctuations in global food security indicators. This approach allowed to go beyond descriptive statistics and provide an interpretation of how wartime factors translate into global food price volatility and supply risks.

A bibliometric analysis was conducted using data from Google Scholar and Scopus Preview, processed using the analytical package Bibliometrix (2025) based on integrated libraries. This allowed to identify dominant research clusters, thematic trends, institutional contributions, and geographical distribution of scholarly publications related to war, agriculture, and food security. The bibliometric search covered publications from 2000 to 2025 to ensure long-term trend coverage. However, priority analytical focus was placed on publications from 2022-2025, reflecting the period of post-2022 war impacts. Frequently

cited publications that most closely match the research keywords formed the main analytical basis for the literature review. The search strategy included the following keywords and combinations: “Ukraine” & “food security”; “war” & “agriculture”; “agricultural exports” & “conflict”; “land degradation” & “military operations”. Inclusion criteria required peer-reviewed journal articles, indexed in Scopus or widely cited in Google Scholar with thematic relevance to agriculture, food security, war impacts, or post-conflict recovery. Exclusion criteria eliminated publications unrelated to agricultural production or food security. The empirical part of the study relied on desk-based data collection, with Statista (2025) serving as the main international statistical database. These data were used to analyse the structure of Ukraine’s exports, the country’s dependence on Ukrainian grain imports, sectoral economic losses, indirect losses to agriculture, and projected recovery needs. To assess the dynamics of world food prices in wartime conditions, a structural and comparative analysis of index indicators, in particular the food price index, was used. The graphical method provided visualisation of trends and relationships, while the abstract-logical method was used to synthesise statistical results and scientific evidence. The limitations of the study are related to the use of secondary data, differences in assessment methodologies in different international sources, and the unpredictable nature of the hostilities, which introduces uncertainty into loss estimates and long-term forecasts. Nevertheless, the applied methodological approach ensures the reliability, transparency, and relevance of the results obtained.

RESULTS

Role of Ukraine in global food security and dynamics of agricultural exports

Ukraine occupies one of the leading places in the ranking of exporters of agricultural products to the world market, which is due to its significant agricultural production potential, which is based on large areas of fertile agricultural lands, a favorable climate, a sufficient number of qualified laborers, a lower level of production costs, compared to other European countries. The ability to export a certain number of agricultural products makes Ukraine to some extent a guarantor of food security in the world, however, the conduct of hostilities on the territory of the state negatively affects its agricultural production potential, which is accordingly reflected in the state of food security of countries that depend on the export of Ukrainian food raw materials. Thus, under these conditions, the restoration of Ukraine’s agricultural

production potential becomes not only a national priority, but also causes concern in a number of countries in the Middle East, Africa, and Asia that depend on Ukrainian food supplies. Thus, Figure 1 presents a comparative characteristic of the dependence of the most food-vulnerable countries in the world on grain supplies from Ukraine and Russia as of June 2022. The data in the figure demonstrate a significant level of dependence of the considered countries of the world on grain supplies from Ukraine, which, according to W. Leal Filho *et al.* (2023), creates grounds for concern about the food security problems in countries that will not receive food supplies due to a number of factors related to hostilities in Ukraine, such as soil contamination, mining of agricultural lands, reduced crop yields, increased production costs.

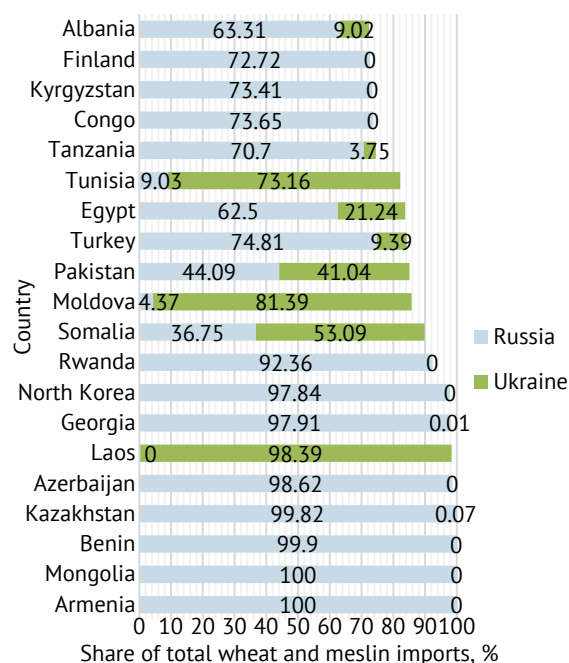


Figure 1. Share of imports from Russia and Ukraine in total imports of meslin and wheat as of June 2022, by country

Source: generalised from Statista (2025)

Overall, Figure 1 demonstrates the vulnerability of a number of countries to shocks caused by disruptions in food supplies due to hostilities and highlights the important role of Ukraine in ensuring food stability in the regions considered. Although a number of countries, such as Georgia, Azerbaijan, Kazakhstan, Kyrgyzstan, and Finland, have demonstrated overwhelming dependence on Russian grain exports, countries such as Laos, Moldova, Tunisia, Somalia, Egypt, Pakistan, Albania, and others are dependent on grain supplies from Ukraine

and, in the event of a reduction or cessation of supplies, may find themselves in a serious crisis. Figure 2 shows how Ukrainian agricultural exports to the European Union (EU-27) changed from 2015 to 2024, reflecting the evolution of the value of trade over a decade marked by

economic reforms, market changes and major geopolitical events. Overall, the data show a steady increase in export volumes, as Ukraine established itself as an important supplier of cereals, oilseeds and processed agricultural products to the EU market.

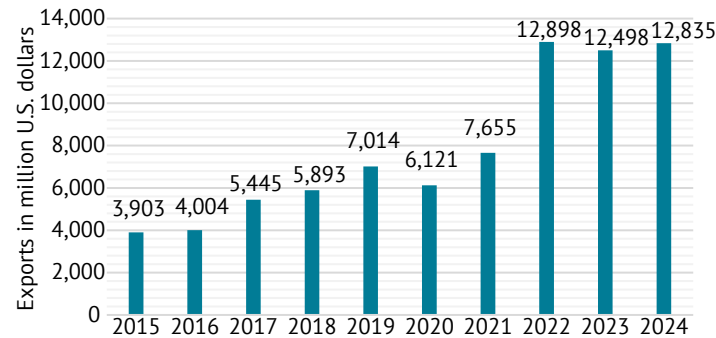


Figure 2. Export value of agricultural products from Ukraine to the European Union (EU-27) from 2015 to 2024, in million U.S. dollars

Source: generalised from Statista (2025)

Starting from a rather modest level in 2015-2016, when annual exports amounted to around four billion US dollars, trade began to gain momentum. In 2017, it exceeded five billion, and by 2019 it was close to seven. Although 2020 brought a slight decline, the sector recovered quickly in 2021, reaching a value of 7.6 billion US dollars. The key jump occurred in 2022, when exports soared to almost \$13 billion, a record high for the entire period. This growth is explained by the fact that the EU became a strategic route for Ukrainian exports after the outbreak of the war, as well as by temporary autonomous trade preferences that simplified access to the European market. In 2023, volumes decreased slightly, but still remained at a high level, and 2024 turned out to be another strong year with exports worth almost \$12.8 billion. This underlines that the EU is Ukraine's main trading partner in the agricultural sector. Overall, Figure 2 illustrates not only the resilience and flexibility of Ukrainian agriculture, but also the increasingly close integration of Ukrainian agri-food trade into the European economic space.

Global food price dynamics under wartime conditions

Long-term sustainable growth confirms that the European Union serves as a key, reliable and vital market for Ukrainian agricultural producers. The corresponding permanent integration of Ukraine into the economic European mechanisms increases its economic stability, helps to modernise Ukrainian agriculture and proves the need for further strategic

partnership. The Figure 3 illustrates the full structure of the Food Price Index (FFPI) from 2000 to 2025, including the main types of goods, such as dairy and meat products, sugar, grain, oil. FFPI is used as an internationally recognised standard to track fluctuations in world food prices. It takes into account a set of key factors, such as changes in demand, weather anomalies, geopolitical situation, market supply, trade policy. The Food Price Index (FFPI) in 2025 reached an average value of 127.8 points, which indicates a partial price recovery after the correction period in 2023 and 2024, as it increased by 4.7% compared to the previous year. At the same time, one can observe a significant difference in the dynamics of prices for certain groups of goods. For example, the vegetable oils index showed the greatest growth, reaching 160.1 points. This is explained by a list of factors such as production deficits in countries exporting these products, high demand for biofuels and prolonged difficulties in logistics. At the same time, the dairy index also increased to 150.6 points as a result of reduced exports and active demand from the Middle East and Asian countries. The average annual grain prices were 108.7 points, but their dynamics were unstable due to production risks in the regions (especially Ukraine) and uncertainty about exports through the Black Sea. At the same time, for example, the price of sugar, which also amounted to 108.7 points, demonstrated relative stabilisation after previous fluctuations. This was due to better harvests in other key countries, which are also producers of this product.

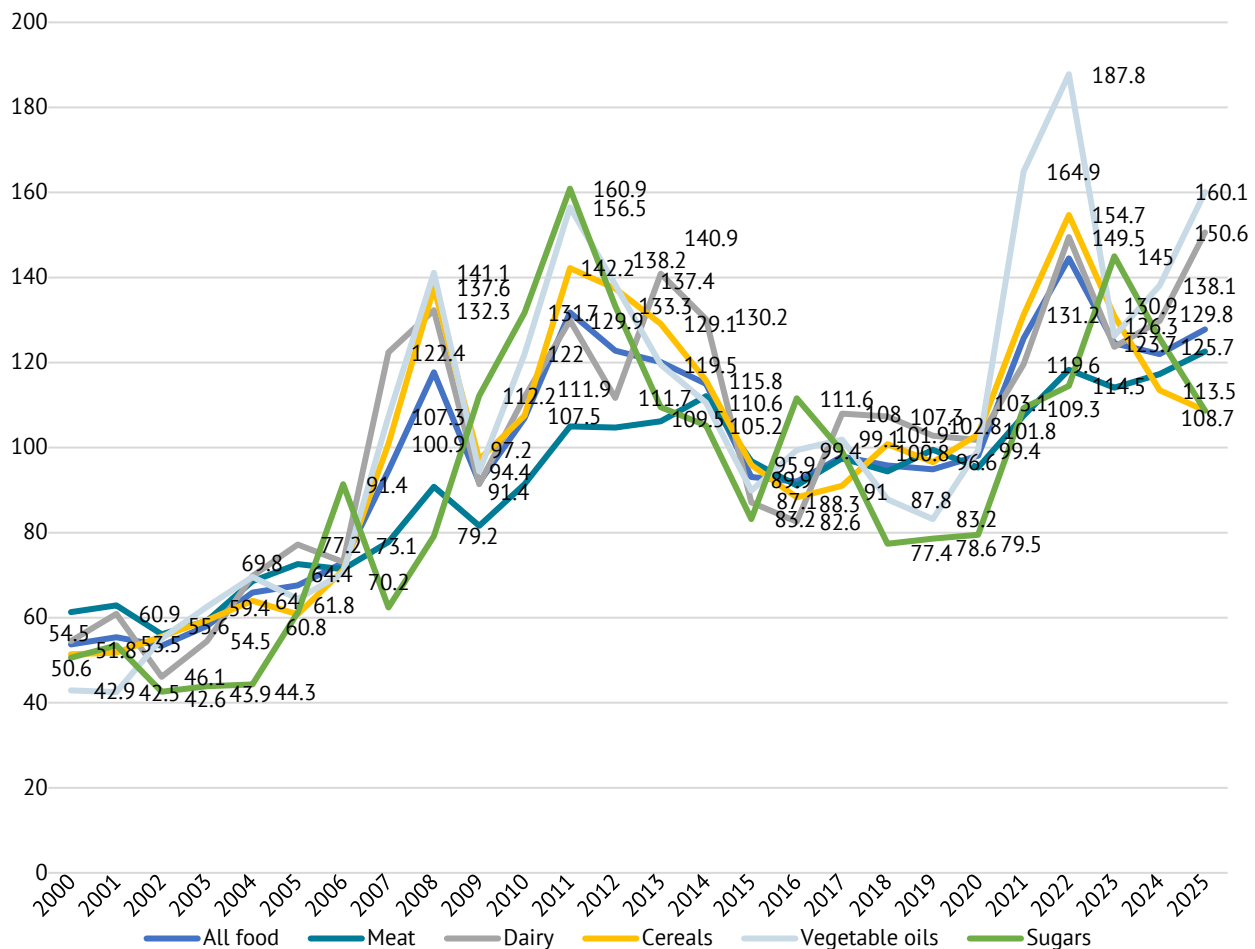


Figure 3. Annual food price index worldwide from 2000 to 2025, by category

Source: generalised from Statista (2025)

Looking across the full historical series, the data reveal pronounced periods of volatility, including the food price surges of 2007-2008, the 2011 peak, and the unprecedented 2022 price escalation, driven by global supply chain disruptions and geopolitical tensions. Subsequent years illustrate both the resilience and fragility of global food markets, as prices responded to shifting economic conditions, weather extremes, and policy interventions. Overall, the long-term trends captured in the table underscore the structural and cyclical factors that shape food price movements worldwide. The 2025 results reaffirm that global food markets remain highly sensitive to external shocks, emphasising the importance of diversified supply chains, sustainable agricultural production, and effective international cooperation to ensure food security and market stability. Overall, the trends captured in the Figure 3 reinforce the crucial importance of strengthening food system resilience, improving supply chain efficiency, and enhancing global cooperation to minimise the impacts of future

disruptions and ensure food security for vulnerable populations worldwide.

Economic losses of Ukraine's agricultural sector and recovery challenges

The Figure 4 provides a detailed breakdown of the estimated economic losses sustained by Ukraine as a result of the full-scale war began on February 24, 2022. These figures cover the period through June 30, 2026, offering a medium-term outlook on the war's financial impact across a wide range of sectors. According to current assessments, commerce and industry have borne the greatest burden, with losses approaching 214 billion U.S. dollars, reflecting extensive damage to enterprises, disrupted supply chains, and diminished production capacity. The agricultural sector, traditionally a cornerstone of Ukraine's economy, follows with losses of roughly 73 billion U.S. dollars, driven by the destruction of farmland, equipment, storage facilities, and export infrastructure.

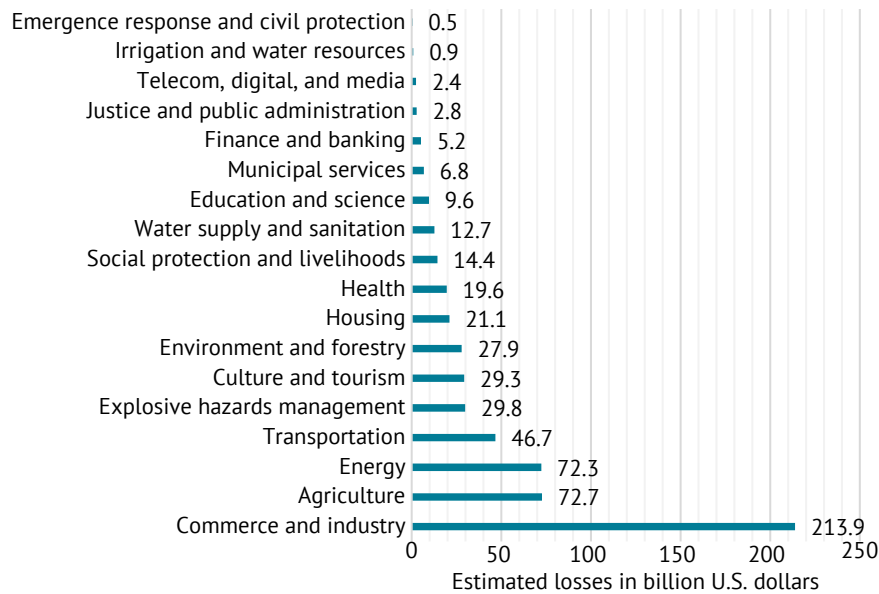


Figure 4. Estimated economic, social, and other monetary losses of Ukraine from the war from February 24, 2022 to June 30, 2026, by sector

Source: generalised from Statista (2025)

Other major sectors, including energy, transportation, and explosive hazards management, have also incurred significant damage, demonstrating the broad scope of disruption caused by ongoing hostilities. Social sectors such as health, education, housing, and social protection similarly reflect substantial losses, underlining the profound humanitarian and societal consequences of the conflict. Meanwhile, sectors like finance and banking, telecommunications, justice and public administration, and emergency response show smaller, yet still meaningful, economic impacts. In total, Ukraine's cumulative monetary losses are estimated at 589 billion U.S. dollars, underscoring the scale of destruction and the long-term challenges the country faces in recovery and reconstruction.

The total losses to the Ukrainian economy of about \$589 billion, of which more than \$72 billion is in agriculture, could have a truly devastating effect if a comprehensive recovery plan is not implemented after the end of hostilities. But the recovery of the agricultural sector, like other sectors of the national economy, must be coordinated with the national food security strategy. But this estimate of losses to the economy as a whole and to agriculture in particular is approximate and does not take into account the factor of the continuation of hostilities for an indefinite period. Figure 5 shows an assessment of indirect losses to Ukraine's agriculture as a result of hostilities. Thus, the most significant losses (more than 34 billion US dollars) are due to a decrease in crop

productivity, which was possible due to a number of circumstances, such as land degradation, damage to land reclamation structures, failure to apply fertilisers due to their untimely delivery or other reasons. The second factor that influenced the losses in agriculture was a decrease in the purchase prices for agricultural raw materials on the Ukrainian market due to the blocking of export supplies. In addition to a decrease in crop productivity, the productivity of farm animals decreased, which also led to overall losses in the agricultural sector. In addition, the increase in production costs caused by inflation, national currency devaluation, disruption of supply chains and others had a significant impact on the losses in the agricultural sector. Additional forced costs for reclamation also increase the total amount of losses. Altogether, these factors amount to approximately 70 billion U.S. dollars in indirect agricultural losses, underscoring how deeply the war has disrupted Ukraine's role as a major global food producer and revealing the long-term challenges that will shape the sector's recovery. Figure 6 shows the projected amount of financial resources needed to restore individual sectors of the Ukrainian economy. As can be seen, the needs of agricultural restoration will require more than 55 billion US dollars, exceeding even the needs of restoring social infrastructure, education and science, healthcare and other important sectors of the country's economy. A separate item of restoration costs includes the costs of demining and disposal of explosive devices, which may amount to about 30 billion US dollars.

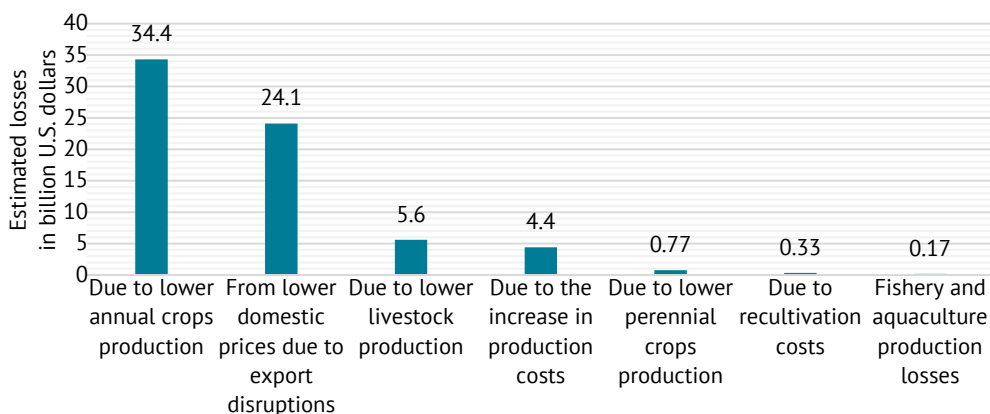


Figure 5. Estimated indirect losses of agriculture due to the war in Ukraine as of December 2023, by reason category
Source: generalised from Statista (2025)

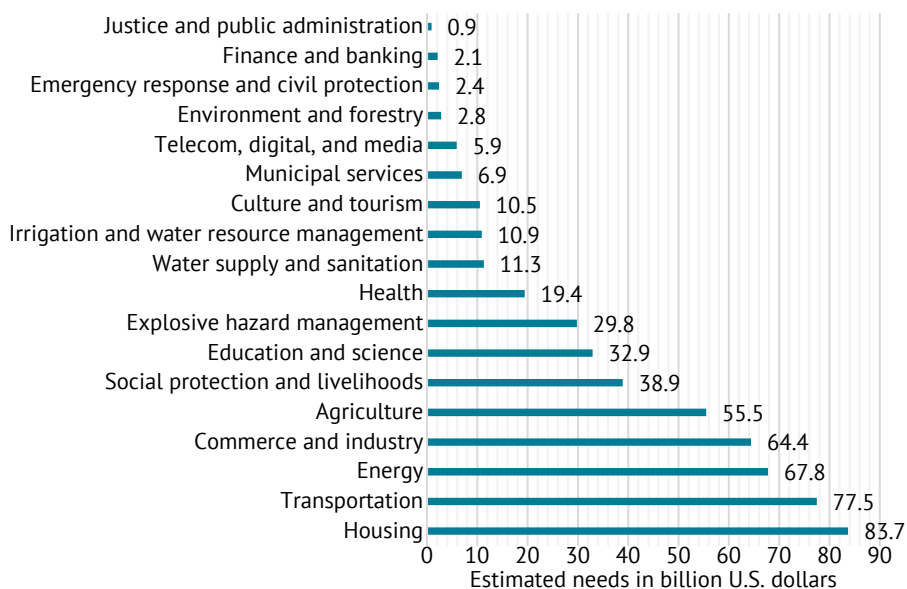


Figure 6. Total estimated recovery and reconstruction needs of Ukraine from 2025 to 2035, by sector
Source: generalised from Statista (2025)

Considering that the problem of demining will mainly concern fields and agricultural lands, this amount can also be attributed to the general need for financing for the restoration of agricultural potential. Thus, if adding up the costs of restoring agriculture and demining, which also indirectly relates to the restoration of agricultural potential, an amount of almost 85 billion US dollars is obtained, which can be compared only with the costs of restoring the housing stock after the end of hostilities. The costs of restoring agricultural production potential may even exceed the costs of restoring the energy sector, which will

require more than 67 billion US dollars. Thus, it can be seen that restoring agricultural production potential requires significant financial resources, the search for which may be a real challenge for the state budget and other non-state institutions ready to invest in the restoration of the agricultural sector of the Ukrainian economy. Restoring Ukraine's agricultural production potential will require a set of actions in response to the challenges that will arise along the way. Thus, the most likely challenges to restoring Ukraine's agricultural production potential and possible solutions to counter them are presented in Table 1.

Table 1. Challenges and solutions for restoring Ukraine's agricultural production potential

No.	Challenges to restoring Ukraine's agricultural production potential	Possible solutions to them
1	Soil damage due to hostilities, its degradation, mining of territories, which may prevent safe cultivation of the soil.	Conduct systematic measures for demining, soil cleaning, training farmers on safe soil cultivation practices.

Table 1, Continued

No.	Challenges to restoring Ukraine's agricultural production potential	Possible solutions to them
2	Disruption of supply chains of key agri-food production inputs, including fertilisers, seeds, agrochemicals, fuel, equipment, and more, which could negatively impact farmers' ability to grow crops.	Implementation of measures to restore logistics infrastructure, search for alternative export channels.
3	Shortage of production workers and specialists due to their internal displacement or migration, mobilisation.	Carry out measures to automate and mechanise agricultural production, conduct personnel training, and implement specialist education programs.
4	Difficulties in obtaining financing, including credit resources, to finance measures to restore agricultural enterprises.	Develop state programs to support agriculture. Attract financing for agriculture, promote comprehensive financial advice to farmers.
5	Market instability and export blockages, which will negatively affect the motivation of agricultural producers and their ability to receive the planned income.	Develop programs to support agricultural producers, implement state mechanisms to stabilise prices for agricultural products. Promote the competitiveness of agricultural producers.

Source: generalised by the authors

In general, the challenges summarised in Table 1 can be grouped into resource-related, institutional, and market-related constraints, which are closely interrelated. Resource-related constraints, such as land degradation, pollution, and labor and resource shortages, are critical because they directly determine the physical feasibility of restoring agricultural production. Institutional constraints, including limited access to finance and the need for effective government support mechanisms, play a coordinating role in ensuring resource mobilisation and implementation of recovery programs. Market-related constraints, such as export disruptions and price volatility, affect producer incentives and income stability, but depend to a large extent on progress in addressing resource-related and institutional challenges. Therefore, addressing resource-related challenges should be considered a priority, as they form the basis for further institutional and market-based recovery efforts.

DISCUSSION

The findings of this study are consistent with and extend recent scholarly discussions on the impact of large-scale armed conflicts on agricultural systems and global food security. Current research increasingly emphasises the interconnected nature of production, environmental, institutional, and market factors, especially in countries that play a key role in international food supply chains, such as Ukraine. A significant body of recent literature confirms the systemic impact of the war in Ukraine on global food security. W. Leal Filho *et al.* (2023) demonstrated that the disruption of Ukrainian agricultural exports has exacerbated food insecurity in import-dependent regions, contributing to price volatility and supply shortages. Their findings strongly support the findings of this study, which highlight Ukraine's continued importance as a global food supplier despite severe production losses. However, while the authors focused mainly on global impacts, this study

complements their work by offering a detailed sectoral and structural assessment of agricultural losses and recovery needs in Ukraine.

The causal relationship between armed conflict and agricultural land degradation is another area where strong convergence of findings can be observed. J. Wagner *et al.* (2025) provided a detailed analysis of the dynamics of agricultural land abandonment, re-plowing and reclamation in war-affected regions of Ukraine, based on remote sensing data. Their study confirmed that the intensity of the conflict directly affects land use patterns and production capacities. These results fully support the conclusion of this study that land degradation and inaccessibility are the most important resource constraints for agricultural recovery. At the same time, this study extends the methodological focus of the aforementioned study by quantifying the economic consequences of land degradation and considering them in the global context of food security. Environmental damage and soil contamination were also addressed by I. Bulba *et al.* (2024), whose findings highlighted the long-term decline in soil fertility caused by military operations. This study confirmed this assessment and further argues that soil restoration is not only an environmental priority but also a key economic prerequisite for the recovery of agricultural production. In this aspect, the results are consistent with recent sustainable development-oriented approaches that emphasise the importance of ecosystem restoration as a foundation for resilient agri-food systems.

A. Poltorak *et al.* (2024) showed that regional differences in logistics infrastructure and export potential undermine the economic security of Ukraine's agricultural sector. These findings are supported by this study, which demonstrates that blocked export channels and price volatility significantly reduce producers' income expectations. However, unlike the authors, who focused on regional economic security, this study paid

more attention to the global consequences of these disruptions, especially through the food price index and dependence on international trade. The role of institutional and social factors in agricultural recovery has received increasing attention in recent studies. A. Kliuchnyk *et al.* (2025) emphasised the importance of local communities in rebuilding agricultural infrastructure after destruction, arguing that decentralised decision-making increases responsiveness and flexibility. This finding supports this study's findings on the need for multi-level governance in the recovery process. At the same time, this study extended this perspective by positioning community participation within a broader framework that includes financial mechanisms, market stabilisation, and national food security strategies.

An important additional dimension is provided by A. Burkovska & A. Burkovska (2025), who analysed the semantic and narrative aspects of food marketing in the context of sustainable development. Their study showed that strengthening the symbolic and communicative value of national agricultural products can increase market resilience and consumer trust during crises. Although this study does not focus directly on marketing strategies, its findings on the need to stabilise agricultural markets and support exporters are consistent with this perspective. Integrating semantic narratives based on sustainable development can thus serve as an additional tool for increasing the competitiveness of Ukrainian agricultural products in the post-war period. The role of women's entrepreneurship in strengthening the strategic development of Ukraine's agriculture is explored by O. Shkarupa *et al.* (2025), who highlighted the role of women's entrepreneurship in strengthening the strategic development of Ukraine's agriculture. Their findings highlighted the untapped human resources, capital that can contribute to recovery and diversification. Although this study focused primarily on macroeconomic and structural challenges, the findings do not contradict this approach, but rather suggest that inclusive policies can enhance the effectiveness of institutional and financial support measures. The article by T. Melnyk *et al.* (2023) examined the state of food security in Ukraine at the national and global levels. Statistical indicators, including FAO data and the Global Food Security Index, were analysed to assess Ukraine's position in comparison with other countries. The study found that despite significant agricultural potential, Ukraine lagged behind many developed countries in several food security indicators due to institutional, economic, and infrastructural challenges. The research concluded that improvements in state policy, agricultural infrastructure, and international cooperation were necessary to strengthen food security in Ukraine.

The broader normative context of food security is reflected in the work of N. Rahman & R. Yasin (2022), who examined the challenges of implementing the Zero Hunger goal during global crises. Their findings highlight the vulnerability of children and socially vulnerable groups to food shortages, reinforcing the argument that disruptions in Ukrainian agricultural production have consequences far beyond national borders. This study adds to this perspective by demonstrating how production losses and export restrictions in Ukraine contribute to the volatility of global food prices, thereby indirectly affecting food access for vulnerable populations worldwide. A new direction in the recent literature explores alternative paths to agricultural recovery through diversification and cross-sectoral integration. S. Pimenow *et al.* (2025) in their study presented an approach that offers valuable insights into diversification opportunities through implementing bioenergy projects into national economy recovery plan. Nevertheless, the bioenergy perspective provided a promising direction for future research, particularly in assessing trade-offs between food production and energy production in the post-conflict period.

A particularly important extension of the global dimension of this study is provided by L. Zhao *et al.* (2025), who developed a cascading failure model to assess global wheat supply security in the context of the war in Ukraine. Their research demonstrated that disruptions in Ukrainian grain exports generate non-linear chain reactions across interconnected international markets, amplifying systemic risks far beyond the directly affected region. An additional macroeconomic and methodological dimension is introduced by L. Zomchak & T. Kukhotska (2025), who applied an autoregressive modelling approach to forecast food prices in Ukraine under conditions of heightened uncertainty.

Comparative international perspectives further contextualised the findings of this study. S. Rieznik & H. Lee (2025), drawing on the experience of rural development in war-torn South Korea, demonstrate that coordinated public policies, long-term investment strategies, and institutional reforms are crucial for successful agricultural recovery. Their findings support the study's argument about the importance of institutional capacity and strategic planning. However, the Ukrainian case is significantly different in terms of scale, geopolitical context, and global integration, requiring adapted recovery strategies rather than direct policy transfer. Overall, the reviewed literature largely supports the key assumptions and conclusions of this study. At the same time, this study makes a significant contribution by synthesising environmental, institutional, market, and social dimensions into a single analytical framework. Unlike

many existing studies that consider individual aspects of the problem in isolation, this article clearly identifies resource constraints as a key driver of recovery, as well as institutional and market challenges. This hierarchical interpretation provides a clearer basis for prioritising policy interventions and allocating financial resources.

CONCLUSIONS

The results of the study showed that the total losses of the Ukrainian economy as of mid-2026 could amount to 589 billion US dollars, 72 billion of which will fall on agriculture. Such losses can have a significant negative impact not only on the state of food security within the country, but also affect the level of food security in the world. The reduction in Ukrainian agri-food exports is dangerous for a number of countries that are almost completely dependent on it. However, despite the negative trends in the destruction of agricultural production potential, Ukraine is increasing exports of agricultural products to the European Union.

Among the main causes of indirect losses to the agricultural production complex of Ukraine, it is worth highlighting the decrease in crop yields due to pollution and soil degradation; a decrease in gross harvest due to the inaccessibility of sown areas due to hostilities; an increase in production costs and inflation. The estimated amount of financial resources needed to restore Ukraine's agricultural potential could exceed

\$55 billion. This funding will be required to address issues related to agricultural land demining and reclamation, restoration of logistics and production infrastructure, provision of financial support to agricultural producers, increasing the competitiveness of Ukrainian products. The prospect of further research includes modeling scenarios for the restoration of individual branches of Ukrainian agriculture in the post-war period with the calculation of their economic efficiency. A separate study is required to study the impact of the set of economic, social, security and environmental factors that determine the achievement of food security on the priority of the restoration of individual elements of the agro-food complex of Ukraine.

ACKNOWLEDGEMENTS

The work was performed within the framework of the research project of Mykolaiv National Agrarian University: "Management of the system of financial and economic security of socio-economic systems at different levels of functioning" (State Registration Number: 0121U113180).

FUNDING

None.

CONFLICT OF INTEREST

None.

REFERENCES

- [1] Alabi, M.O., & Ngwenyama, O. (2023). Food security and disruptions of the global food supply chains during COVID-19: Building smarter food supply chains for post COVID-19 era. *British Food Journal*, 125(1), 167-185. [doi: 10.1108/BFJ-03-2021-0333](https://doi.org/10.1108/BFJ-03-2021-0333).
- [2] Bibliometrix. (2025). Retrieved from <https://www.bibliometrix.org/home/>.
- [3] Bulba, I., Drobitko, A., Zadorozhnyi, Yu., & Pismennyi, O. (2024). Identification and monitoring of agricultural land contaminated by military operations. *Scientific Horizons*, 27(7), 107-117. [doi: 10.48077/scihor7.2024.107](https://doi.org/10.48077/scihor7.2024.107).
- [4] Burkovska, A., & Burkovska, A. (2025). Semantic approach to food marketing: The influence of sustainable development narratives on the Ukrainian market. *Agricultural and Resource Economics: International Scientific E-Journal*, 11(1), 317-347. [doi: 10.51599/are.2025.11.01.12](https://doi.org/10.51599/are.2025.11.01.12).
- [5] Burkovska, A., Shebanina, O., Lunkina, T., & Burkovska, A. (2022). [Socio-psychological determinants of food security in Ukraine: Causal aspect](https://doi.org/10.1515/est-2022-0012). *Economic Studies*, 31(5), 145-162.
- [6] Cheng, J., & Yu, X. (2024). Regional differences, distributional dynamics and convergence of multidimensional food security levels in China. *PLoS ONE*, 19(8), article number e0309071. [doi: 10.1371/journal.pone.0309071](https://doi.org/10.1371/journal.pone.0309071).
- [7] Davydenko, N., Vorobei, R., & Maslo, A. (2025). Innovation financing and its impact on the agricultural sector of Ukraine. *Financial and Credit Activity Problems of Theory and Practice*, 4(63), 381-390. [doi: 10.55643/fcaptop.4.63.2025.4795](https://doi.org/10.55643/fcaptop.4.63.2025.4795).
- [8] Kliuchnyk, A., Shyshpanova, N., Prohoniuk, L., Galunets, N., & Husenko, A. (2025). The role of local communities in the restoration of agricultural infrastructure after destruction. *Scientific Horizons*, 28(4), 180-196. [doi: 10.48077/scihor4.2025.180](https://doi.org/10.48077/scihor4.2025.180).
- [9] Leal Filho, W., Fedoruk, M., Eustachio, P.P.J.H., Barbir, J., Lisovska, T., Lingos, A., & Baars, C. (2023). How the war in Ukraine affects food security. *Foods*, 12(21), article number 3996. [doi: 10.3390/foods12213996](https://doi.org/10.3390/foods12213996).

- [10] Lin, F., Li, X., Jia, N., Feng, F., Huang, H., Huang, J., Fan, S., Ciais, P., & Song, X.-P. (2023). The impact of Russia-Ukraine conflict on global food security. *Global Food Security*, 36, article number 100661. doi: [10.1016/j.gfs.2022.100661](https://doi.org/10.1016/j.gfs.2022.100661).
- [11] Melnyk, T., Tunitska, Y., & Banas, D. (2023). Food security of Ukraine: National and global level. *Economics and Business Review*, 9(3), 181-205. doi: [10.18559/eb.2023.3.927](https://doi.org/10.18559/eb.2023.3.927).
- [12] Pimenow, S., Pimenowa, O., Moldavan, L., Udova, L., Wasilewski, M., & Wasilewska, N. (2025). Transforming agriculture into energy: Unlocking Ukraine's bioenergy potential for sustainable post-conflict recovery. *Energies*, 18(5), article number 1212. doi: [10.3390/en18051212](https://doi.org/10.3390/en18051212).
- [13] Poltorak, A. (2015). [Assessment of Ukrainian food security state within the system of its economic security](https://doi.org/10.1515/apo-2015-0012). *Actual Problems of Economics*, 11, 120-126.
- [14] Poltorak, A., Stamat, V., Sukhorukova, A., Dovgal, I., & Onyshchenko, D. (2024). Strategies for regional disproportion management to restore economic security in the Ukrainian agricultural sector. *Ekonomika APK*, 31(6), 48-58. doi: [10.32317/ekon.apk/6.2024.48](https://doi.org/10.32317/ekon.apk/6.2024.48).
- [15] Rahman, N., & Yasin, R. (2022). Children rights to "zero hunger" and the execution challenges during the COVID-19 crisis. *Hasanuddin Law Review*, 8(2), 139-159. doi: [10.20956/halrev.v8i2.3684](https://doi.org/10.20956/halrev.v8i2.3684).
- [16] Riezniak, S., & Lee, H. (2025). Post-war revitalization of Ukrainian agriculture: Lessons from South Korea's rural development model. *Transylvanian Review of Administrative Sciences*, 75E, 114-129. doi: [10.24193/tras.75e.7](https://doi.org/10.24193/tras.75e.7).
- [17] Shebanin, V., Shebanina, O., & Kormyshkin, Y. (2024). Implementation of circular economy principles to promote the development of rural areas. *Ekonomika APK*, 31(2), 51-59. doi: [10.32317/2221-1055.202402051](https://doi.org/10.32317/2221-1055.202402051).
- [18] Shkarupa, O., Vlasenko, D., & Makedon, H. (2025). Women's entrepreneurship in Ukrainian agriculture: Identifying channels for strengthening strategic development. *Agricultural and Resource Economics International Scientific E-Journal*, 11(1), 213-239. doi: [10.51599/are.2025.11.01.08](https://doi.org/10.51599/are.2025.11.01.08).
- [19] Statista. (2025). *Ukraine – statistics & facts*. Retrieved from <https://surl.lu/nfvnbw>.
- [20] Wagner, J., Nair, S.S., Skakun, S., Duncan, E.C., Li, F., Oliinyk, O., Nerry, F., Reh binder, J., & Becker-Reshef, I. (2025). Monitoring cropland cultivation, abandonment, fallowing and recultivation dynamics with regard to conflict intensity in war-affected Ukraine. *Science of Remote Sensing*, 12, article number 100326. doi: [10.1016/j.srs.2025.100326](https://doi.org/10.1016/j.srs.2025.100326).
- [21] Zhao, L., Xie, W., Li, H., Sun, S., Yi, H., Zhou, L., & Yang, P. (2025). Assessing global wheat supply security based on a cascading failure model in the context of the Russia-Ukraine conflict. *Food Security*, 18(1), 7-28. doi: [10.1007/s12571-025-01610-z](https://doi.org/10.1007/s12571-025-01610-z).
- [22] Zomchak, L., & Kukhotska, T. (2025). Building food security resilience in Ukraine: The autoregressive approach to food price forecasting. In *Studies in systems, decision and control* (pp. 403-424). Cham: Springer. doi: [10.1007/978-3-031-80935-4_19](https://doi.org/10.1007/978-3-031-80935-4_19).

Україна як гарант продовольчої безпеки світу: виклики на шляху до відновлення агровиробничого потенціалу

Анастасія Полторак

Доктор економічних наук, професор
Миколаївський національний аграрний університет
54008, вул. Георгія Гонґадзе, 9, м. Миколаїв, Україна
<https://orcid.org/0000-0002-9752-9431>

Вікторія Стамат

Кандидат економічних наук, доцент
Миколаївський національний аграрний університет
54008, вул. Георгія Гонґадзе, 9, м. Миколаїв, Україна
<https://orcid.org/0000-0001-5789-4023>

Анна Сухорукова

Кандидат наук з державного управління, доцент
Миколаївський національний аграрний університет
54008, вул. Георгія Гонґадзе, 9, м. Миколаїв, Україна
<https://orcid.org/0000-0002-6170-4955>

Анна Бурковська

Доктор філософії з економіки
Миколаївський національний аграрний університет
54008, вул. Георгія Гонґадзе, 9, м. Миколаїв, Україна
<https://orcid.org/0000-0003-0563-6967>

Вадим Петренко

Викладач
Університет прикладних наук Вайєнштефан-Тріздорф
91746, вул. Маркграфен, 16, м. Вайденах, Німеччина
<https://orcid.org/0009-0005-3590-6632>

Анотація. Головною метою цього дослідження був аналіз викликів, що постають перед Україною в процесі намагання зберегти та відновити її агровиробничий потенціал, що зазнав суттєвого руйнування внаслідок ведення бойових дій на території держави. У дослідженні було використано бібліометричний аналіз (із використанням Google Scholar, Scopus Preview та пакета Bibliometrix), системно-структурний аналіз і синтез, а також історичні, діалектичні, графічні та описово-статистичні методи. Дослідження продемонструвало, що попри руйнування агровиробничого потенціалу, Україна залишається важливим постачальником сільськогосподарської продукції для багатьох імпортозалежних регіонів світу. У статті було підкреслено, що світові продовольчі ринки продовжують залишатися нестабільними, що підтверджується Індексом продовольчих цін, який досяг 127,8 пункти у 2025 році, демонструючи вразливість продовольчих систем до геополітичних шоків. За оцінками експертів, станом на першу половину 2026 року сукупні втрати від руйнувань української економіки внаслідок війни можуть сягнути 589 млрд доларів, з яких близько 72 млрд доларів припадатиме на сільське господарство. Визначено, що в структурі непрямих втрат сільськогосподарського сектору України внаслідок війни найбільший вплив мали чинники скорочення продуктивності виробництва, зниження цін на продукцію через порушення експорту та зростання виробничих витрат. Зазначено, що потенційні витрати на реконструкцію аграрного сектору України в період з 2025 по 2035 роки можуть перевищити 55 млрд доларів, а витрати на розмінування сягнути майже 30 млрд доларів. Встановлено, що експорт української аграрної продукції до ЄС досяг майже 12,8 млрд доларів США у 2024 році, що демонструє стійкість аграрного сектору України та поглиблення інтеграції до європейських ринків. Практична цінність дослідження полягає у комплексній оцінці аграрних втрат України, спричинених війною, аналізі їхніх глобальних наслідків та визначенні стратегічних заходів відновлення

Ключові слова: вплив війни на сільське господарство; продовольчі ланцюги постачання; порушення експорту; забруднення земель; відбудова сільськогосподарського комплексу