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Ukraine, its Food security and future

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Introduction:

Food security is a critical component of a nation's well-being, directly impacting the health, social stability, and economic development of its population. This policy paper focuses on Ukraine, exploring current challenges, strengths, and potential policy recommendations to enhance food security in the country.

Current State of Food Security in Ukraine:

Ukraine, as a major agricultural producer and exporter, plays a significant role in global food markets. However, despite its agricultural potential, challenges persist, affecting both rural and urban populations. Issues such as climate change impacts, economic factors, and forms of land use contribute to variations in food security levels across regions. Finally, the negative results of the ongoing Russian invasion of the country range from soil contamination to internal displacement.

Introduction

As the concept of human security built on the notion of the need for a holistic perspective on security, the framework of food security became one of the cornerstones of the concept (Moscatelli et al. 2016). Food security is a fundamental concern for any nation's stability and development, given the uttermost importance of food in the life of any human. In this policy paper, we dive into the details of Ukraine's food security landscape, aiming to understand its current state, identify key challenges, and propose a relevant set of policy recommendations.

Ukraine has significant agricultural potential, serving as a major player in global food markets (Ben Hassen & El Bilali 2022). However, despite this advantage, the country faces a myriad of obstacles that impact the food security of its own population. The challenges span across the four main dimensions of food security paradigm; these include climate change effects, land use dynamics, and economic pressure on accessibility. While the effects of food insecurity influence both rural and urban populations (Babych & Kovalenko 2018), the variability between the different regions of the country, as well as general trends, affect certain rural areas more in contrast to urban centres.

The ongoing military actions of the invasion forces of the Russian federation heavily threaten the food security of Ukraine in addition to the dimensions mentioned above. Although most of the research connects this situation with the global food security framework, the reality on the ground highlights the relatively undocumented food insecurity of the Ukrainian population itself. According to the main threats introduced to the Ukrainian context by the armed conflict, the analysis highlights soil contamination (Certini, Scalenghe & Woods 2013), internal displacement of the affected population, infrastructure destruction (Shumilova et al. 2023) and socio-economic aspects of the war economy of the country.

The goal of this policy paper is to explore the challenges of Ukraine's food security and to present a set of potential policy recommendations suitable to solve existing challenges. By promoting pragmatic policies, our aim is to contribute to the discourse on improving food security in Ukraine and fostering sustainable development for the nation as a whole, especially with the added context of the ongoing accession process for the membership of the European Union (Anghel & Danki 2023).

Long term threats outside of the conflict

While an armed conflict on the territory of a country poses a major challenge not only to the food security framework, it should also not fully cover the pre-existing threats, which tend to be of a long-term category. The list of these threats includes land use, impacts of climate change, economic factors, and distribution inefficiencies that contribute to variations in food security levels between regions.

Climate Change Impacts

Climate change poses a formidable threat to Ukraine's food security, exacerbating existing environmental challenges and disrupting established production patterns. The country is experiencing a myriad of climate-related challenges, including changing precipitation patterns, an increased frequency of extreme weather events, and rising temperatures. These changes not only threaten agricultural productivity, but also the overall sustainability of food supply, thus influencing both the availability and stability dimensions of food security.

Erratic weather patterns, characterised by unpredictable rainfall and temperature fluctuations, disrupt agricultural cycles and compromise crop yields (Müller et al., 2016). Heatwaves, droughts (Polevoy et al. 2024), and floods have become more frequent and severe, causing substantial damage to crops, livestock, and infrastructure depending on the region of the country. These climate-induced shocks not only threaten food production, but also undermine its long-term prospects for stabilisation.

Climate change amplifies environmental stressors, such as soil degradation, water scarcity (Didovets et al. 2020), and pest outbreaks, further compromising agricultural productivity. Soil erosion and salinisation degrade arable land, reducing its fertility and productivity (Menshov & Kruglov 2023). Water scarcity, exacerbated by changing precipitation patterns and increased evaporation rates, poses challenges for irrigation-dependent agriculture, particularly in regions reliant on river water for irrigation in the south of the country, which in turn further suffer from related soil degradation (Chornyy & Isaeva 2023).

Climate change leads to an increase in pest and disease outbreaks, further threatening agricultural productivity. Warmer temperatures and changing weather patterns create favourable conditions for pests and pathogens that were previously kept in check by colder climates (Rosenzweig et al. 2001).

Finally, climate change-induced weather extremes in the case of Ukraine, especially floods and droughts, can cause direct physical damage to agricultural infrastructure. Floods can destroy irrigation systems, storage facilities, and transportation networks, while droughts can dry up water sources and degrade soil quality (Polevoy et al. 2024). The infrastructure damage further disrupts food production, storage, and distribution, leading to increased food insecurity, highlighting how climate change disrupts all four dimensions of food security framework.

Economic Factors

Economic factors play a significant role in shaping food security in Ukraine. Fluctuations in global commodity prices, currency exchange rates, and market dynamics influence domestic food prices, affecting consumers' purchasing power and access to nutritious food (Babych & Kovalenko 2018). The economic instability in Ukraine directly affects domestic food prices. The reduced purchasing power affects especially low-income households, generally in the rural areas (Mostenska et al. 2022). Economic volatility influences the accessibility of food, as even minor increases in prices can push vulnerable populations into hunger.

Structural issues within the agricultural sector, such as inadequate infrastructure, limited access to credit and finance, and inefficient value chains, restrict productivity and market access for smallholder farmers (Galli et al. 2020). Limited access to credit and financial services is another critical barrier for smallholder farmers. Inadequate infrastructure is an additional barrier to food accessibility. Poor road networks and insufficient transportation facilities hinder the efficient movement of agricultural produce from farms to markets, especially in rural regions (Zghurska et al. 2022).

Socio-economic disparities between urban and rural areas further exacerbate food accessibility issues. Urban areas generally have better infrastructure, more diversified economies and higher income levels, which improve food accessibility (Mykolaichuk & Mykolaichuk 2017). In contrast, rural populations often face higher levels of poverty, limited employment opportunities, and greater dependence on subsistence farming, making them more vulnerable to food insecurity. Economic realities in rural and marginalised urban areas form cycles of poverty and malnutrition, especially among the Roma community (Bocheva 2019).

Finally, the lack of coordination and integration within the supply chain leads to inefficiencies that result in food loss and waste. For instance, inadequate handling practices during transportation and storage can cause significant spoilage of perishable goods (Zghurska et al. 2022). Additionally, market distortions such as monopolistic practices and lack of competition allow a few large players to dominate, manipulating prices and reducing market access for smaller producers (OECD 2021) and further diminishing the position of rural areas in the market (Perrotta 2020).

Land Use Dynamics

Historically, Ukraine has been renowned for its vast tracts of fertile agricultural land, often referred to as the "breadbasket of Europe." However, changes in land use practices, driven by factors such as urbanisation, industrialisation, and land ownership policies, have had profound implications for food production, distribution, and sustainability.

Land ownership patterns and agricultural policies have influenced the dynamics of land use, contributing to disparities in access to land and agricultural resources, as well as its use. The concentration of land ownership in the hands of a few large-scale producers, coupled with

fragmented land tenure systems, hampers smallholder farmers' ability to access land and adopt sustainable agricultural practices (Galli et al. 2020). This disparity in land access exacerbates rural poverty and food insecurity, particularly among marginalised communities (Kuryltsiv & Kryshenyk 2018).

The war on food security?

The Russian invasion of Ukraine has had profound and multilevel implications for the country's food security, exacerbating existing vulnerabilities and creating new challenges for the local population. The conflict, which in a certain way began in 2014, but turned into a full-scale invasion at the beginning of 2022 has led to widespread displacement, destruction of infrastructure, and disruption of agricultural activities. The destruction results severely impact food production, distribution, and access in both the affected regions of direct fighting and the rest of the country.

Displacement and Disruption of Agricultural Activities

One of the most immediate consequences of the conflict has been the displacement of millions of people, both internally and externally. The displacement of rural communities has disrupted agricultural activities, leading to a decline in food production and livelihood opportunities. Farmers have been forced to abandon their land, livestock, and agricultural assets, resulting in decreased yields or crop losses. The overall land abandonment accounted for up to 7 % of the total cropland (He et al. 2023) and 22 % reduction in the overall land sowed (EC 2024)

Furthermore, the conflict has resulted in the destruction of critical agricultural infrastructure, including irrigation systems, storage facilities, and processing plants. This infrastructure damage has affected agricultural productivity and post-harvest handling, exacerbating food loss and waste. Estimates by the European Commission point out an approximate 29 % reduction in the grain production of the country (EC 2024)

Impact on Livelihoods and Food Access

The conflict has also had a devastating impact on livelihoods, in both the rural and urban settings. Disrupted supply chains, market closures, and trade restrictions have limited access to inputs that further hamper agricultural production in rural areas and income generation in urban settings (Ihle et al. 2020). These factors are especially true in the areas adjacent or directly affected by the ongoing military operations. The closer to the frontline, the worse the situation gets, as was highlighted during the intense battles for urban areas of the Donetsk region. The mapping of the effects on the population remains increasingly less possible with the dynamic development of the fighting areas.

Environmental Degradation and Agricultural Losses

The conflict has also resulted in significant environmental degradation and agricultural losses, further undermining food security in Ukraine. Landmines, unexploded ordnance, and military

activity have contaminated agricultural land, rendering it unsafe for cultivation and grazing (Certini, Scalenghe & Woods 2013). This contamination poses long-term risks to food safety and human health, hindering agricultural recovery and rehabilitation efforts (see Figure 1.).

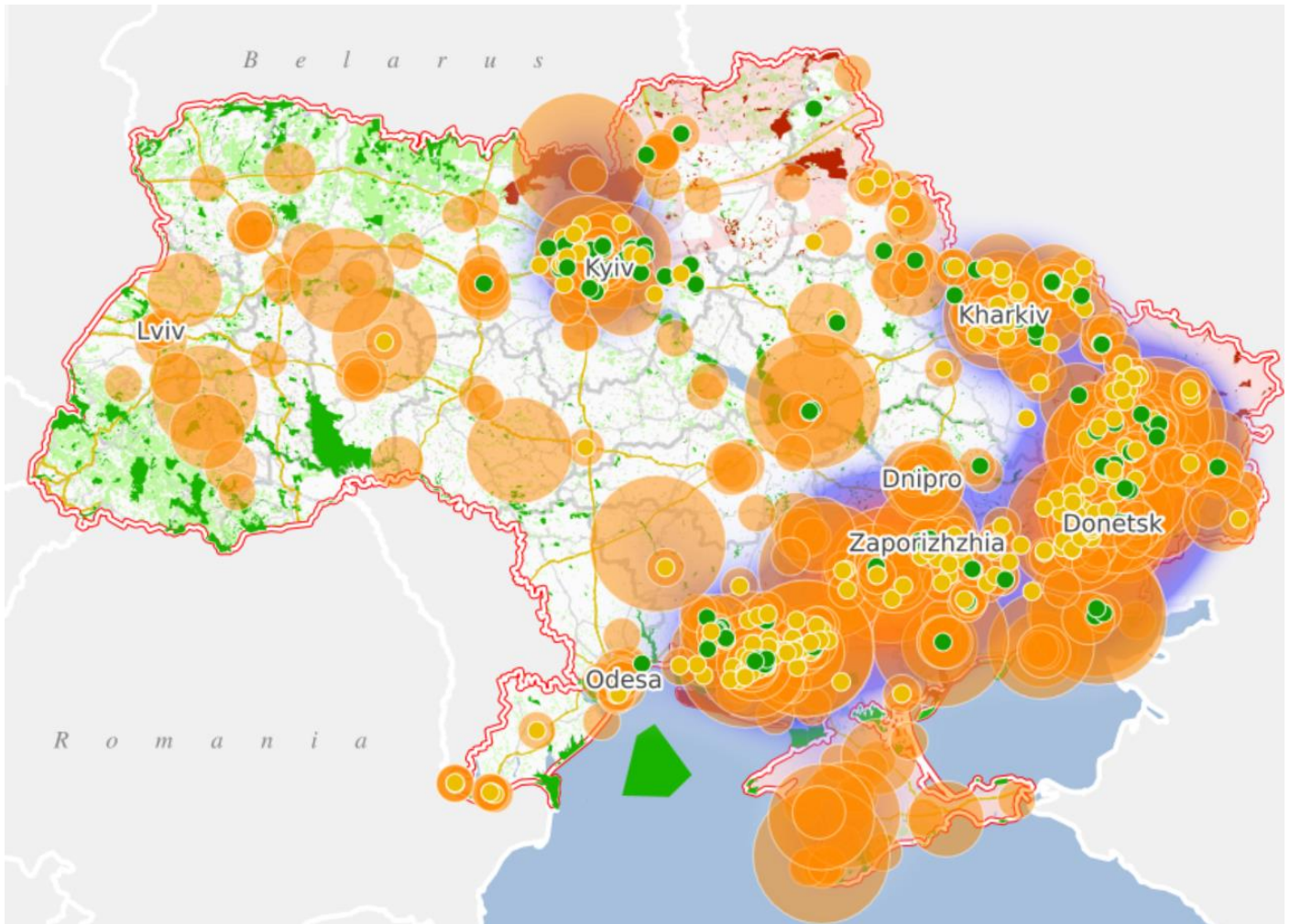


Figure 1. Map of environmental consequences and risks of the fighting in Ukraine from <https://ecodozor.org>

As the conflict has disrupted traditional land use patterns and agricultural practices, leading to land abandonment and soil degradation (Rey Benayas et al. 2007). These localised patterns can not only disrupt production but, more importantly, as seen in the context of water source contamination, pose a major threat to the adjacent areas via indirect means (Shumilova et al. 2023).

Potential policy approaches

In light of the multifaceted challenges facing Ukraine's food security, a strategic and comprehensive approach is essential to address the root causes and promote sustainable solutions. Based on the list of threats, this section presents a set of policy recommendations aimed at mitigating threats, improving resilience and fostering inclusive agricultural development in Ukraine.

Support for small and medium-scale farms

Providing small and medium scale farmers with better access to credit and financial services is crucial. Financial support enables these farmers to invest in high-quality seeds, fertilisers and modernise their farming equipment, which are essential for improving agricultural productivity (Dvulit & Zlotnik 2018). Programs that offer low-interest loans and grants can help farmers expand their operations, adopt innovative practices, and reduce their vulnerability to economic shocks (Galli et al. 2020).

Improving infrastructure, such as road networks and transportation facilities, can enable small- and medium-scale farmers to access markets more efficiently. Poor infrastructure often hinders the timely movement of agricultural produce from farms to markets, leading to significant post-harvest losses (Zghurska et al. 2022). Enhancing storage facilities and transportation logistics can reduce these losses, ensuring that more food reaches consumers and stabilising prices; such enhancement could be encouraged by legislative support for farmer cooperatives. Such encouragement for the formation of cooperatives and the integration of small farmers into value chains can significantly increase their market presence and bargaining power. Cooperatives allow farmers to pool resources, access larger markets, and benefit from economies of scale (Borodina 2013). Integrating the value chain ensures that small farmers receive fair prices for their produce and reduces the inefficiencies that lead to food loss and waste.

The increased number of smaller-scale producers generally promotes crop diversification and sustainable agricultural practices, which can enhance the resilience of food production (López et al. 2017). Diversification reduces dependency on a single crop, spreading risk and improving food security. Sustainable practices, such as conservation tillage, organic farming, and efficient water management, help maintain soil fertility, conserve water resources, and mitigate the impacts of climate change (Kirieieva & Semenenko 2017). Finally, providing small-scale farmers with training and capacity building programmes is essential to equip them with the knowledge and skills needed to adopt modern agricultural practices. Education on sustainable farming techniques, pest management, and market trends can empower farmers to increase productivity and reduce losses (Galperina 2014). Extension services and farmer field schools can play a critical role in this regard.

Climate Resilience

Given the increasing frequency and intensity of climate-related risks, developing and implementing climate-resilient farming practices is the key to ensure agricultural livelihoods and food security in Ukraine. These practices include sustainable and diversified production methods and innovative tools such as gene editing, which help crops adapt to the changing environment. Efficient water management is essential for climate resilience, particularly in regions prone to droughts and water scarcity. Implementing advanced irrigation techniques, rainwater harvesting and developing water-efficient crop varieties can help optimise water use and ensure a reliable water supply for agriculture (Kucher et al. 2023).

Leveraging technology and innovation is a second critical step for building climate resilience. Precision agriculture, which involves using data and technology to optimise farming practices, can improve resource efficiency and reduce vulnerability to climate impacts. Early warning systems and climate forecasting tools can help farmers make informed decisions and prepare for adverse weather conditions (Kopytko, 2016). Genetically modified crops can, given the correct legislative support, allow for a more resilient and less resource-dependent production, in spite of the changing environment (Smyth, Phillips & Castle 2024).

Strong policy frameworks and institutional support are necessary to promote climate resilience. Policies that encourage sustainable practices, provide financial support for climate adaptation measures, and facilitate access to climate information and technology. Such steps can be achieved by providing subsidies and financial incentives for farmers who adopt environmentally friendly practices, such as reduced tillage, cover cropping, and organic farming, is essential. Furthermore, building the capacity of farmers and stakeholders through education and training is crucial for successful climate mitigation.

Implementing Policies for Economic Stability

Achieving economic stability is essential to foster a conducive environment for agricultural development and investment. Although such steps seem almost impossible in the context of an armed conflict, the preparation of plans for the use of available tools and existing funds should be among the priorities of the government. Unstable economic context threatens food security in both the short-term and long-term horizons, as not only the population suffers through uncertain purchasing power, but foreign capital lacks the securities necessary for investment, which could help to boost food production capabilities.

Conclusion

Securing food security in Ukraine requires a comprehensive strategy that includes the enhancement of agricultural productivity, land use reforms, the promotion of climate resilience, the achievement of economic stability, and the optimisation of distribution networks. The ongoing conflict presents a significant challenge, exacerbating existing vulnerabilities and creating new threats to food production, distribution, and accessibility. Despite these obstacles, opportunities exist for resilience building and collaborative efforts.

Implementing the proposed policy interventions has the potential to contribute to a more secure and sustainable food system for Ukraine, safeguarding the well-being of its citizens and potentially helping economic development. These policy recommendations are directed towards mitigating threats and strengthening resilience within the Ukrainian food system. Specific focus areas include modernisation of agricultural practices, implementation of support programmes for small-scale farmers, promoting climate-resilient agricultural systems, stabilising the disrupted economic landscape, enhancing food distribution efficiency, and fostering collaboration among agricultural producers.

The success of these measures builds upon sustained collaboration among policymakers, stakeholders, and the agricultural community. Through the implementation of pragmatic policy interventions, grounded in inclusive stakeholder engagement, Ukraine can construct a more resilient food system, guaranteeing access to safe, nutritious, and affordable food for its population.

Key findings

- A comprehensive strategy is needed to address agricultural productivity, land-use reforms, climate resilience, economic stability, and distribution networks for improved food security in Ukraine.
- The ongoing conflict significantly exacerbates existing vulnerabilities and creates new obstacles for food production, distribution, and accessibility in Ukraine.
- Implementing proposed policies focused on modernisation, small farmer support, climate resilience, economic stabilisation, distribution efficiency, and farmer collaboration can strengthen Ukraine's food system.
- Successful implementation of these measures requires sustained collaboration among policymakers, stakeholders, and the agricultural community.

Policy recommendations

Support small and medium scale farmers

Enhance the climate change mitigation and adaption toolkit of the country

Help farmer initiatives to start cooperatives across the country in order to empower them

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Agri Policy Lab – A new unit established within the BioResources & Technology division at the Czech University of Life Sciences Prague.

Agri Policy Lab is a dynamic, multidisciplinary and innovative unit dedicated to advancing agricultural and related policies and practices for sustainable and inclusive development. It is committed to evidence-based decision-making and operates at the intersection of research, stakeholder engagement, and policy advocacy.

Mission

To foster the development and implementation of effective agricultural and related policies through rigorous research, collaboration, and advocacy.

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