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Ukraine, Conflict

## **Challenges in the Agricultural Supply Chain of Europe's 'Breadbasket': Identifying Obstacles and Potential Solutions**

War. A piercing, unyielding wound in the lives of millions of Ukrainians and a detriment to the global food supply chain. While conflict is often always present to some degree in developing countries, the situation in Ukraine is far more severe in terms of scale and intensity. With almost three million people employed in the agricultural industry and roughly forty-two million hectares of agricultural land, Ukraine plays a critical role in the global food supply chain (Sikorsky, 2020). It is one of the world's top producers of winter wheat, corn, and sunflower products. Some countries, such as Niger, Madagascar, and Kenya, rely on Ukraine for up to eighty percent of their food supply (Inskeep, 2022). All of this shows how the disruption of agricultural activities in Ukraine not only puts Ukraine in jeopardy, but also the rest of the world.

The agricultural strength of Ukraine begins with the Ukrainian people, of which the family unit is a critical component. Ukrainians are very family-oriented people, with upwards of fifty-five percent of households being nuclear households and thirty-two percent being multi-generational (United Nations, 2022). Families tend to be small with an average of two children, and it is not uncommon for the grandparents to live in the same household to help raise the children. Typically, the father works outside the home and the mother takes care of the household. Mealtime is very important for Ukrainians as this is when the family can gather as a whole and have meaningful conversations. A typical meal might consist of Salo, or Pig's fat with garlic, Borshch, or beet soup, Vareniki, or ravioli, and Golubsti, or cabbage rolls. The close-knit dynamic makes farming a practice that is often supported by the entire family.

When Ukrainian family farmers Olga and Andriy Lialiuk faced threats of Russian airstrikes, they knew for the safety of their family, sacrifices to their asparagus and berry harvest had to be made. Taking care of the farm was a family practice. Olga's father, Mykola Gorbatenko was responsible for the organization and mechanization of the farm. Her mother, Svitlana Gorbatenko communicates with buyers and suppliers. Olga herself describes the farm as being her "child", "it changes every day, needs attention and our work" (Harnish, 2022). However, in the face of the war all these responsibilities were forced to pause. The situation faced by Olga and her family has been one of many; because of the war twenty-five percent of the rural population have reduced or completely stopped their agricultural activities and output. (Cavallito, 2022) In addition, overall unemployment in Ukraine, which in 2022 was 9.3%, has significantly risen since the beginning of the war (The World Bank, 2022). This means that not only is there less food making it to Ukrainian markets and foreign aid programs, but it is also harder for families across Ukraine to afford and obtain an adequate food supply.

These disturbances come as many Ukrainians face bare shelves when shopping at local markets. In previously occupied Kherson, Dmytro Bahnenko struggles to find food for his wife and five-year-old daughter. He and others in his community are forced to bike miles in unstable territory to seek aid from Father Serhiy of the local church. Upon arrival however, Dmytro finds the church to be vacant, and learns that the Priest was taken by Russian "police". Dmytro is not alone, as many as thirty-six percent of Ukrainians reported not having enough food to eat, and fifty-two percent reported regularly limiting their portion sizes (Rudolfson, 2022). This food insecurity is disproportionately felt in the Donbas region and along the Black Sea where intense fighting occurs.

The war has not only disrupted family farm activities making it harder to afford or obtain food, but it has also adversely impacted children and school attendance. Before the war almost all children ages six to eleven were enrolled in school, obtaining a critical education for the support of Ukrainian industrial agriculture (UNESCO, 2023). However, as of May 29th, 2022, 1,888 schools have suffered damage from complications of conflict, forcing children to move or attend online schooling (UNESCO, 2023). In Izyum, a city located in Eastern Ukraine, ten-year-old Bohdan dreams of attending school again, but his family has no means to afford virtual classes as a large majority of money is spent on food and critical supplies. If they run out of food, they must rely on the unpredictable support of their neighbors and community (Unicef, 2023). This adversely affects the future of education, and resulting might of Ukraine's workforce.

The agricultural power of Ukraine has also been obstructed by the country's relative development. Although Ukraine received a Human Development Index classification of high (0.773) in 2021, which was similar to the classification of Mexico and Indonesia, the persisting conflict has made it difficult for this number to increase, prohibiting families from reaching a developed status (UNDP, 2022).

Recent threats to the Zaporizhzhia and Chernobyl nuclear power plants along with surrounding energy infrastructure have left many lacking adequate heat, water, and lighting (Action, 2023). Due to this, more funding has been allocated to provide basic infrastructure needs rather than improving food production or international aid. It is also a problem that there is no universal healthcare system in Ukraine, and it is estimated that only about ten percent of patients can afford treatment (Thelwell, 2020). If farm workers are injured when tending their field during the conflict, they are likely to receive little or costly support. The cost, coupled with the increase in danger, has made many farmers more reluctant to tend to the field. Moreover, the COVID-19 pandemic, despite its now relatively mild impact in Ukraine, has magnified the challenge of accessing healthcare, particularly for agricultural workers who require vital support.

The situation in Ukraine remains dire, particularly in the East and South where the ongoing conflict has left port cities such as Mariupol, Kherson, and Mykolaiv along the Black Sea and the Sea of Azov in ruins. The port city of Odesa is one of the only major distribution points not currently experiencing heavy fighting, but it is still significantly unsafe for Ukraine to distribute food exports through this port.

The impact of the war on these port cities is particularly devastating as they are responsible for a significant proportion of Ukraine's agricultural exports (Delmy, 2022). Ukraine has already lost an estimated 1.5 billion USD in grain exports (Bubola, 2022), contributing to the large drop in Ukrainian food aid to developing countries. In addition, conflict has led to the destruction of six large granaries within Ukraine, exacerbating the already arduous task to provide food domestically (Bubola, 2022).

The Donbas region is also experiencing substantial conflict with large cities such as Kharkiv experiencing heavy shelling. The shelling destroys roads and makes trips to obtain food difficult and dangerous. This was exemplified during an overcast afternoon in Kremenchuk - a city located just south of Kharkiv - when a large shopping mall was struck by a missile. It is estimated that one-thousand civilians may have been inside at the time of the attack (The Associated Press, 2022). Because of attacks like these, many Ukrainians feel unease about making trips to get the food they need. Even populations further inland such as in Kyiv, Zhytomyr, and Lviv have been struck by long range missiles, showing that this is a country-wide complication (Dyachyshyn, 2022).

In addition, in July 2023, Russia broke off cooperation with Ukraine over the Russo-Ukrainian grain deal. This grain deal was critical to ensuring aid reached developing countries especially along the Horn of Africa and the Sahara region within reach of Turkey. Following abrupt attacks on Ukrainian sea ports, Russia declared any ships leaving the ports of Ukraine to be considered as military targets, this includes critical Ukrainian grain shipments in the Black Sea. Russia also placed increased sea mines in the Black

Sea to further discourage any grain shipments from leaving port cities. Russia declared wide areas in the Black Sea dangerous for shipping products from Ukraine. They also raised their own grain prices following the drop in market supply, making it harder for critically reliant developing countries to afford food shipments since the support coming from Ukrainian ports (partnered with the U.N.) was provided at reduced prices.

To improve the accessibility and availability of food in Ukraine and beyond, a negotiated peace must be reached between opposing sides. The reopening of the agricultural supply line, re-establishment of the agricultural might initiated by Ukrainian families, and resumption of farming activities are all imperative. One of the ways this can be done is by using farming as a liaison. By organizing "Neutral Ground Farms" where conflicting parties can collaborate to produce food and work towards peace, both agricultural and civil relations can be improved. At these farms, combatants can work together to clear the fields of any dangerous ordnance, ensuring a safe environment for workers to resume their agricultural activities. After this is done, both sides could work together to manage the farm without apprehension of danger. If established, these farms would help build connections between both sides, possibly easing conflict.

The effectiveness of "Neutral Ground Farms" has been demonstrated previously in countries such as Myanmar and Columbia. In the northwestern Dry Lands region of Myanmar, several local villages have established mutualistic rice farming efforts with Pyusawhti militant groups (Loong, 2022). These rice farms helped generate food and peaceful collaboration within the area. Furthermore, in Columbia after a five-decade-long conflict with the FARC (a guerrilla rebel group), farming interventions have brought communities and combatants together in remote parts of the country to produce food (InSight Crime, 2022). Both cases demonstrate how "Neutral Ground Farms" can provide critical resources to areas in need of healing. The effectiveness of this strategy in Myanmar and Columbia shows how a similar initiative in Ukraine could be established for mutual benefit.

Another solution can be the empowerment of individuals to grow their own food by safe, responsible means. Since ordinary large-scale industrial farms - as of present conflict - are dangerous to maintain, a new temporary method to grow food can be adopted. This can be done through small-scale, inexpensive hydroponics bottles. Hydroponics bottles, which can be something as simple as recycled water, juice, or soda bottles, are versatile and compact, capable of being used vertically and in small spaces. They can be arranged in arrays for larger growing area as well as in the dark for growing items such as white asparagus and mushrooms which require little to no light. This solution will provide food and significantly reduce the dangers that come with tending a field during conflict. They can be implemented in both urban and rural areas but are especially useful for empowering urban areas to create a temporary food supply when resources are scarce and travel outside these heavily protected areas is dangerous. Their small size makes them easily moveable and arrangeable, which is necessary in times of conflict to stay safe or adapt to change.

The hydroponics bottle initiative is comparable with aid efforts in northeast Nigeria. In this region, several nonstate armed groups have forced populations to flee to garrison towns surrounded by defensive trenches. To empower these individuals, aid agencies provided grain and adaptable tools, which were used to set up small scale, temporary farms in the defensive trenches (Bernstein, 2021). This practice meets immediate food needs for the townspeople, builds community, and maintains critical farming skills. In this sense, hydroponic bottles - serving as affordable small-scale farms - can be distributed to those in need, following the example set in Nigeria. They will serve as temporary aids for the people, until regular farming and commerce can resume. This idea is also adapted in a similar way to the "Victory Gardens" grown in the United States during World War I and II. They may help boost a strained food supply and create a stronger sense of unity within the community of Ukraine.

Finally, to improve the present food crisis in Ukraine and beyond, distribution efforts must be supported. Ukraine has more than twenty million tons of grain from its 2021 harvest in storage (Tropynina, 2022). Not only is this food critically needed, but it also disrupts the current harvest as there is nowhere to store newly grown food from the next year. One way to resolve this issue is by using humanitarian food flights, or humanitarian highways. Through these distribution pathways, it is possible to collect and distribute grains to peaceful nations in need of assistance. However, it is important to note two possible complications to this solution.

One is that conflict has rendered the transportation of agricultural products unsafe, posing a challenge to many developing nations as well as the Ukrainian population. Apart from the port of Odesa, all major seaports in Ukraine are currently under a pronounced threat, and the transportation infrastructure in and around the Ukrainian oblasts Kherson, Zaporizhzhia, and Donetsk have also suffered significant damage. Therefore, to ensure that the transportation of food to other countries is unobstructed, it is imperative to safeguard these humanitarian highways.

Prior to the conflict, Ukraine had been one of the largest suppliers of commodities to the World Food Programme, and through efficient and adequately protected highways it is important that this previous trend can be maintained (Ritchie, 2022). Contributions by non-governmental organizations such as the UN can help distribute and protect the already abundant agricultural resources within Ukraine.

The other complication is that the majority of those employed in distribution in Ukraine are men aged eighteen to sixty, who are restricted from driving Ukrainian agricultural exports across the border or are currently serving in the war (Bubola, 2022). By temporarily lifting travel restrictions for drivers and providing additional volunteer drivers from aid agencies this problem can be resolved. Through increased distribution, Ukraine will also gain much needed GDP which it can use on both ending the conflict and war relief efforts.

Conflict in Ukraine is a subject that is both indescribable and yet painfully familiar. Through all the difficulties that accompany this calamity one point is certain, families in Ukraine endure – and will continue to fight for the betterment of their country. The destruction of farms and roads may have hindered the essential agricultural supply chain of Ukraine, but it has not stopped it. With the coupling of essential aid, peace negotiations, and reconstruction efforts, current difficulties can be resolved and developing countries around the world will once again receive much-needed support from Europe's "breadbasket". However, until this is achieved, Ukrainian families will continue to fight for blue skies and golden wheat aplenty. As is said in Ukrainian, "Дух нашого народу буде жити!" (The spirit of our people will live!).

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