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## New Study Shows How Ukraine War Impacts Global Food Supply Chain, Urges Alternative Routes for Grains

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New INFORMS Journal *Transportation Science* Study Key Takeaways:

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The war has made Ukraine's Black Sea ports unsafe, disrupting grain exports and causing shortages in key regions.

Grain prices have skyrocketed from \$270 to \$500 per ton, worsening food insecurity in vulnerable countries.

There is an urgent need to develop new transportation routes to prevent further disruptions in the global food supply.

**BALTIMORE, MD, January 13, 2025** – A groundbreaking new study in the INFORMS journal *Transportation Science* reveals the severe and far-reaching consequences of Russia's full-scale invasion of Ukraine on global food security. The research highlights an urgent need to address disruptions in the transportation of Ukrainian grains, which have caused dramatic price spikes and worsened food insecurity worldwide, particularly in vulnerable regions such as the Middle East and North Africa.

“The war has caused massive disruptions in Ukraine's grain exports, with Black Sea ports – vital for the global grain trade – becoming largely inaccessible due to the ongoing conflict,” says Anna Nagurny, professor at the University of Massachusetts Amherst. “This has significantly threatened food supply chains worldwide, especially those that rely heavily on Ukrainian grain exports.”

The study, “A Multiperiod, Multicommodity, Capacitated International Agricultural Trade Network Equilibrium Model with Applications to Ukraine in Wartime,” also highlights the dramatic increase in food prices. Before the invasion, grain was priced at around \$270 per ton, but that price has nearly doubled, reaching as high as \$500 per ton in some countries. This sharp increase has made it even harder for people in these regions to afford food, worsening the food insecurity crisis.

“For many families, rising prices mean that basic staples are becoming unaffordable, pushing more people into hunger,” says Dana Hassani, Ph.D. student at the University of Massachusetts Amherst.

The study emphasizes the urgent need for alternative transportation routes.



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“With traditional shipping routes blocked by the war, there is an immediate need to develop new ways to transport grain and other essential goods to prevent further disruptions. Without these new routes, global food shortages could become even more severe in the coming months,” says Nagurney, the Eugene M. Isenberg Chair in Integrative Studies; Ph.D. Coordinator in Operations Management; Director of Virtual Center for Supernetworks; Operations & Information Management Department of the Isenberg School of Management at UMass Amherst.

The impact of the war is also being deeply felt by Ukrainian farmers. Before the war, Ukrainian farmers earned around \$270 per ton of grain. However, due to disruptions in production, transportation and storage caused by the war, their earnings dropped to only \$100 per ton for two consecutive harvest seasons – below production costs. Meanwhile, farmers in the U.S. and EU experienced record profits, the highest in more than two decades. Overall, the war has caused agricultural economic losses of around \$70 billion, with a third of the capital in the sector destroyed. This significant drop in earnings is putting immense pressure on Ukraine’s agricultural economy, exacerbating the challenges brought on by the conflict.

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Ukraine must see greater international cooperation to address the global food crisis. This paper urges governments and organizations worldwide to work together to find solutions that can help stabilize the global food supply and ensure that people in food-insecure regions have access to the nutrition they need.

“By finding sustainable solutions and developing new transportation methods, the international community can prevent further shortages and mitigate the long-term effects of the crisis,” concluded Nagurney.

**[Link to full study. \(https://pubsonline.informs.org/doi/full/10.1287/trsc.2023.0294\)](https://pubsonline.informs.org/doi/full/10.1287/trsc.2023.0294)**

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