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Alternative Food Transportation Routes from Ukraine

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Abstract: The Russian invasion of Ukraine has severely disrupted traditional food export routes, intensifying food security risks, particularly in import-dependent regions such as North Africa and the Middle East. This article employs geopolitical and policy analysis as qualitative research methods to assess the feasibility and long-term sustainability of alternative food transportation routes. Geopolitical analysis examines how territorial disputes, security risks, and power dynamics influence the accessibility of trade corridors, while policy analysis evaluates the impact of EU trade regulations, infrastructure policies, and cross-border agreements on the efficiency of these alternatives. Applying a structured evaluation framework, the study compares alternative transport routes – including land-based corridors through the EU, maritime alternatives constrained by Black Sea security risks, and trans-Caspian pathways – based on four key criteria: political stability, infrastructure capacity, regulatory barriers, and economic viability. The findings confirm that while alternative routes provide short-term relief, their long-term viability depends on regulatory harmonisation, infrastructure investment, and sustained diplomatic coordination to maintain stable trade networks and mitigate future geopolitical disruptions.

Keywords: armed conflict, supply chains, food security, transport routes

1. Main text

1. Introduction

The Russia–Ukraine war has severely disrupted global agricultural trade, threatening the stability of food supply chains and amplifying food insecurity in vulnerable regions such as the Middle East and North Africa (FAO, 2022b;

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IFPRI, 2023). Ukraine's role as a key exporter of wheat, corn, and sunflower oil made it central to pre-war food security dynamics. However, the blockade of Black Sea ports and damaged infrastructure have revealed the critical role of transportation corridors in ensuring not only economic continuity but also geopolitical stability (European Commission, 2022a; WFP, 2023).

Food security is traditionally defined as secure access to sufficient and nutritious food (FAO, 1996), yet recent scholarship emphasises the strategic importance of resilient transport infrastructure in achieving this goal (Bailey and Wellesley, 2023; Nelson et al., 2021). The war has exposed how transport chokepoints, particularly in maritime and border logistics, function as systemic vulnerabilities. At the same time, food transport corridors have become geopolitical instruments used to apply pressure or negotiate political leverage (Koch, 2020; Walker, 2023). The blockade of Ukrainian grain exports illustrates how food can be weaponised within broader territorial and strategic disputes (Kaplan, 2012; Fair et al., 2017).

This article addresses a key gap in the literature: how geopolitical risks and regulatory responses shape the long-term resilience of food transportation networks. While several policy initiatives, such as the EU's Solidarity Lanes, have offered temporary alternatives, their long-term feasibility remains uncertain. The research seeks to answer the following question: How do geopolitical risks and trade policies influence the feasibility of alternative food transport routes from Ukraine, and which options offer sustainable long-term solutions?

The study hypothesises that while emergency corridors provide short-term relief, sustainable trade stability requires regulatory harmonisation, investment in infrastructure, and multilateral coordination. Adopting a qualitative approach, the article combines geopolitical and policy analysis to assess four key dimensions: political stability, infrastructure readiness, regulatory barriers, and economic viability. The analysis draws on official documents, EU and FAO reports, and logistics sector data.

2. Methodology

This article applies a structured qualitative evaluation to assess the feasibility of four alternative export corridors for Ukrainian agricultural products. The selected routes include: (1) the Danube River Corridor, (2) Land-Based EU Corridors, (3) Baltic Sea Ports, and (4) the Middle Corridor via the Caspian Sea. These were identified through document analysis as the main pathways used since the disruption of Ukraine's maritime exports in 2022.The analysis uses a four-criteria framework derived from policy studies and logistics literature (Rodrigue, 2020; EPRS, 2022; FAO, 2023):

Political Stability – exposure to conflict, political restrictions, and diplomatic volatility;
Infrastructure Readiness – capacity and efficiency of port, rail, and road systems;
Regulatory Barriers – customs controls, phytosanitary rules, and institutional constraints;
Economic Viability – comparative transport costs, efficiency, and long-term sustainability.

Each corridor was evaluated across these dimensions using a 1–5 scoring model, where 1 represents high constraint and 5 reflects optimal conditions. To ensure a weighted assessment, the following importance coefficients were applied:

Infrastructure Readiness – 30%
Economic Viability – 25%
Political Stability – 25%
Regulatory Barriers – 20%

These weights reflect infrastructure's centrality to operational capacity, as well as the strategic cost and political dimensions of cross-border transport. Scores were assigned based on data from EU and FAO reports, customs flow statistics, port and railway operator data, and institutional analyses (European Commission, 2022a; RailFreight, 2024; UNCTAD, 2023; Lviv Analytical Center, 2023).

To ensure transparency, Table 1 presents a comparative summary of each corridor based on the four evaluation categories. Scores were elaborated using operational and institutional indicators such as export volumes, waiting times, political disruption frequency, and per-ton transport costs. A detailed explanation of scoring values is provided to clarify the qualitative scaling logic used in the model.

Table 1. Comparison of Alternative Food Transport Routes

Route	Political Stability	Infrastructure Readiness	Regulatory Barriers	Economic Viability
Danube River Ports	Stable but Sensitive	Increased Capacity, Canal Limitations	Navigational Regulations, Port Congestion	Cost-Effective; Competition Raises Costs
Land Route via EU Borders	Generally Stable, Recent Import Bans	Gauge Differences, Ongoing Investments	Varying Customs Procedures, Import Restrictions	Increased Costs Due to Delays
Baltic Sea Ports	Stable	Increased Exports, Transshipments Needed	Standard EU Regulations	Higher Costs Due to Distance
Middle Corridor	Politically Varied	Multiple Transshipments, Infrastructure Gaps	Diverse Customs Regulations	High Costs; Less Competitive

3. Results and Discussion

3.1. Ukraine's Role in Global Food Security and the Impact of the Black Sea Blockade

Ukraine has long been a pillar of global food security, ranking among the top exporters of wheat, maize, and sunflower oil (FAO, 2022b; Halkin, 2024). In 2021 alone, it contributed approximately 10% of global wheat exports and nearly 50% of sunflower oil. These exports were vital to food access and price stability in many import-dependent countries, particularly in the Middle East and North Africa (FAO, 2023; IFPRI, 2023). Russia's invasion in February 2022 and the subsequent blockade of Black Sea ports—especially Odesa, Mykolaiv, and Chornomorsk—disrupted over 90% of Ukraine's grain exports (European Commission, 2022a). This led to a sharp spike in global food prices, with wheat rising by over 20% in mid-2022. The FAO warned of worsening food insecurity, and the World Food Programme forecast acute hunger increases in conflict-affected and drought-prone regions (FAO, 2022b; WFP, 2023). In response, Ukraine and its partners sought emergency alternatives. The EU established "Solidarity Lanes" to facilitate overland and river exports, and the Danube corridor via Constanta became increasingly important (European Council, 2023; Nikiforenko and Kuryliuk, 2024). Although helpful, these options could not match the volume and efficiency of pre-war maritime trade. The war has also reshaped Ukraine's transport strategy. Investments in rail and road links to EU markets have expanded, while diplomatic efforts like the Black Sea Grain Initiative offered temporary relief until Russia's withdrawal in mid-2023 (UNCTAD, 2023). The blockade illustrates how food exports can be used as a geopolitical tool, destabilising import-dependent economies and triggering global supply chain shifts (Fair et al., 2017; Neik et al., 2023).Rodrigue (2020) argues that global supply chains hinge on a few key corridors, making them extremely vulnerable during geopolitical shocks. As a result, governments are increasingly regionalising trade systems, and Ukraine is reconfiguring its transport infrastructure accordingly. International institutions such as FAO, WTO, and the EU are now under pressure to institutionalise long-term frameworks for food trade resilience (Lviv Analytical Center, 2023).

3.2. The Rise and Limits of Alternative Export Corridors

Before the war, Ukraine exported 95% of its grain via Black Sea ports (FAO, 2022b; EPRS, 2022). The Russian blockade forced a dramatic shift toward land and river routes. However, these alternatives have introduced significant logistical and economic challenges (Bailey and Wellesley, 2023). Road transport through Poland, Romania, Slovakia, and Hungary became vital for short-haul exports, but customs delays and congestion at border crossings, such as Yahodyn-Dorohusk and Shehyni-Medyka, slowed progress (Lviv Analytical Center, 2023). Baltic ports – Gdańsk, Klaipėda, and Riga – have handled increased flows, but high transshipment costs and long distances reduce efficiency (Klaipeda Port, 2024). Rail transport via corridors like Chop-Čierna nad Tisou and Vadul-Siret-Dornești faces complications due to differing rail gauges between Ukraine and the EU, requiring costly and slow transshipment (EPRS, 2022). Despite investments, these routes cannot fully absorb maritime trade volumes. The EU estimates that Solidarity Lanes moved around 60 million tonnes of agricultural goods between 2022 and 2023 (Welsh, 2024). The Danube has emerged as a crucial inland waterway, especially via ports like Reni and Izmail. In 2023, more than 20 million tonnes of grain were exported through the Danube corridor – an increase of 40% from the previous year (Rudyk, Bubela and Maciuk, 2023). Yet, the Sulina Canal's limited capacity and inadequate port infrastructure cause delays, despite EU pledges for improvement. Looking beyond Europe, the Trans-Caspian International Transport Route (Middle Corridor) offers long-term diversification potential. It links Ukraine to Central Asia and China via multimodal connections through Georgia, Azerbaijan, and Kazakhstan. However, high costs, inconsistent infrastructure, and political complexity limit its current viability (RailFreight, 2024; Middle Corridor, 2024). Although these routes have partially mitigated the crisis, they remain fragmented and inefficient. Long-term food export stability from Ukraine will require major infrastructure investment, Regulatory harmonisation, and enhanced multilateral coordination.

3.3. Comparative Evaluation of Alternative Export Corridors

The final evaluation applies the weighted scoring system outlined in the methodology section to determine the overall feasibility of each corridor. Table 2 presents the calculated scores for Political Stability (25%), Infrastructure Readiness (30%), Regulatory Barriers (20%), and Economic Viability (25%) for the four identified routes.

Table 2. The Final Weighted Scores for Each Route

Route	Political Stability (25 %)	Infrastructure Readiness (30 %)	Regulatory Barriers (20 %)	Economic Viability (25 %)	**Weighted Final Score**
Danube River Ports	4 – Stable, Minor Risks	3 – Port Congestion, Sulina Canal Limits	3 – EU Navigation Rules	4 – Cost-Effective, Competition for Vessels	**3.45**
Land Route via EU Borders	3 – Border Protests, Bans	3 – Gauge Mismatch, Congestion	2 – Customs Inefficiencies	3 – Moderate Cost, Delays	**2.85**
Baltic Sea Ports	5 – Very Stable	4 – Strong Ports, Transshipment	4 – Standard EU Customs	3 – High Distance Costs	**3.75**
Middle Corridor	2 – Geopolitical Uncertainty	2 – Infrastructure Gaps, Delays	2 – Complex Regulations	2 – Expensive, Inefficient	**2.15**

The results indicate that Baltic ports (3.75) and the Danube River corridor (3.45) currently offer the most promising alternatives to Black Sea maritime routes. Both are politically secure and benefit from increasing export volumes, yet each faces key structural and logistical constraints.

- Baltic Ports are highly stable and benefit from EU-standard infrastructure and regulation. However, long transport distances and transshipment needs reduce cost-efficiency.
- The Danube corridor is cost-effective and strategically positioned but remains constrained by limited port capacity and bottlenecks along the Sulina Canal (UNCTAD, 2023; FAO, 2023).
- Land-based EU routes, while flexible and moderately cost-efficient, are susceptible to political volatility, especially in the context of grain import bans and border protests (Welsh, 2024).
- The Middle Corridor remains the least viable due to its geopolitical complexity, fragmented infrastructure, and prohibitively high costs (Middle Corridor, 2024; RailFreight, 2024).

The findings suggest that no single corridor can fully substitute Ukraine's pre-war maritime infrastructure. However, a combination of Baltic and Danube routes, supported by targeted investment and regional cooperation, may offer a scalable and stable export architecture in the long term. Institutional support from the EU, multilateral coordination, and regulatory harmonisation will be essential to address the shortcomings of each pathway and to prepare the regional food logistics systems for future crisis.

4. Conclusions

The article examined how geopolitical risks and trade policies shape the feasibility of Ukraine's alternative food transport routes. The findings confirm that infrastructure constraints, political volatility, and regulatory complexity jointly determine corridor viability. Among the assessed options, the Baltic ports and the Danube River corridor emerged as the most promising long-term solutions, offering relative political stability and operational infrastructure. However, both face constraints including port congestion, high transport costs, and procedural inefficiencies. Land-based EU corridors remain critical but are vulnerable to shifting national policies, protest-related blockades, and customs inconsistencies. The Middle Corridor, while offering trade diversification potential, is limited by geopolitical uncertainty and fragmented logistics in transit states. Ukraine's diversification of export routes has helped stabilise global food markets, particularly in food-importing regions of the Middle East and North Africa. Yet maintaining and enhancing these corridors requires more than emergency measures. The resilience of Ukraine's export logistics will depend on sustained EU infrastructure investment, trade facilitation, and diplomatic coordination with transit countries. The study confirms the initial hypothesis: while no single route can fully substitute the Black Sea maritime network, a combination of well-supported and coordinated alternatives can strengthen Ukraine's trade resilience and reinforce global food security in the face of future disruptions.

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