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IMPACT OF THE WAR IN UKRAINE ON INTERNATIONAL TRADE TRENDS

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Abstract. The ongoing war in Ukraine, which began in 2014, has significantly disrupted global trade, particularly in energy, agriculture, and supply chains. This study integrates economic, trade, and geopolitical theories with empirical data to analyse the conflict's immediate and long-term effects on international trade. Key findings reveal a sharp decline in Ukraine's agricultural exports, with grain and oilseed shipments dropping over 40% since 2022, exacerbating global shortages. Fertilizer exports from both Russia and Ukraine have also plummeted, causing a 70% increase in global prices and impacting agricultural productivity in countries like Bangladesh, Egypt, and India. In response, nations have reshuffled trade partnerships, with Egypt increasing wheat imports from India and Brazil, and Indonesia turning to Australia and China for fertilizers, albeit with higher costs and logistical challenges. The conflict has led to a 20% rise in global food prices, worsening food insecurity, especially in vulnerable regions. The study underscores the need for diversified supply sources, enhanced domestic agricultural production, and resilient supply chains to mitigate the impacts of geopolitical conflicts on global trade and food security.

1. Introduction

Trade globalization has linked economies around the world, resulting in a complex tapestry of interconnectedness. The article examines a significant geopolitical event, the war in Ukraine, which began in 2014, and its consequences for worldwide international trade. Beyond its immediate and grave human consequences, the crisis in Ukraine has catalyzed far-reaching economic disruptions, affecting energy markets, supply networks, agricultural exports, and, as a result, global trade patterns.

The first section will examine pre-war trade patterns and Ukraine's place in the global economy to place the Ukrainian war within the framework of contemporary global politics. Known as the "breadbasket of Europe," Ukraine has historically played a significant role in the global food supply chain by exporting large quantities of grain and other agricultural products (Steinbach, 2023). Patterns of agricultural commerce in Egypt, Turkey, Indonesia, India, and Bangladesh have been significantly impacted by the war in Ukraine. Prices for commodities like wheat and vegetable oils have increased as a result of the violence's disruption of the global supply chain. The problem has been made worse by Russia's invasion of Ukraine, which has hurt North African and Middle Eastern nations that depend on imports (Janzen & Zulauf, 2023).

Furthermore, the harm to international trade has been made worse by the severe sanctions imposed on Russia in response to its actions. Concerns over the long-term sustainability of the current trade dynamics have been raised by these sanctions, which have led to supply routes being rerouted and trade alliances restructuring (Sytnik et al., 2019).

Global supply networks have had to be reorganized as a result of these changes, which have forced nations to look for food and raw resources from new trading partners. It is anticipated that the war will have a significant impact on these nations' agricultural trade trends, changing global trade patterns and challenging established trade dynamics (Ozili, 2024).

By integrating economic, trade, and geopolitical theories with quantitative trade data and qualitative expert analysis, this article aims to present a comprehensive picture of the immediate and long-term repercussions of the war in Ukraine on global trade trends. By offering insights into the resilience of the global economic system and policy recommendations to avoid such repercussions in the future, the ultimate purpose is to contribute to the conversation about how significant geopolitical events affect global trade.

2. Theoretical aspects of impact of war in Ukraine on international trade trends

The theoretical review of the relationship between war and trade includes a variety of viewpoints, including liberal and realist theories. According to liberal ideas, economic interdependence lessens the likelihood of war because economically interdependent countries stand to lose more from war. Realist theories, on the other hand, argue that economic interconnectedness increases the possibility of war since countries can use economic power to obtain political leverage. The impact of war on trade is also important to consider since it can cause disruptions in the global supply chain, resulting in shortages and higher prices for commodities like grains and vegetable oils (Glauben et al., 2022).

One of the articles observes that the debate over the effects of commerce on war has shown contradictory results, with positive, negative, and indeterminate connections found between trade and war (Janzen & Zulauf, 2023). However, the liberal idea that commerce reduces war dominates contemporary thought, notwithstanding the difficulty of finding convincing evidence for the mechanisms provided by available hypotheses. Realists have used comparable data to demonstrate that trade leads to more war (Rose et al., 2023).

The effects of war on the agricultural sector are a complex and multifaceted subject. This influence's theoretical components include environmental, social, and economic aspects. In the case of Ukraine, where the war has caused significant interruptions and losses in agricultural productivity, the connection between violence and agricultural activity is evident (Braun et al., 2023). Grain, vegetable, and fruit production has decreased as a result of the war's catastrophic damage to agricultural infrastructure. Additionally, the war has affected the economy and the livelihoods of farmers by reducing agricultural export capability (Ukrstat, 2025). Land usage and agricultural activities are influenced by biophysical factors, socioeconomic circumstances, and the nature of the war. Furthermore, the relationship between food insecurity and war is important to explore, since hunger and food insecurity can both cause and be caused by war. The impact of Ukraine's war on its agricultural industry is a vivid example of the far-reaching effects of armed war on agriculture, food security, and a country's overall well-being (Glauben et al., 2022). The impact of war on trade in the work presented in Figure 1.

Other scholars, attempted to support theoretical and applied notions while highlighting obstacles in agricultural development during the post-war economic recovery (Legrand, 2023). This study examines current changes in the agrarian sector during the military war between Ukraine and Russia. The current state of Ukraine's agrarian sector has led to challenges in supplying agricultural products to European Union countries, resulting in a considerable drop in food security.

International trade relationships are greatly impacted by geopolitical considerations. The research explores the geopolitical dynamics and potential shifts in trade relations among Egypt, Turkey, Indonesia, India, and Bangladesh in the context of their commercial interactions with Ukraine. The selected countries–Egypt, Turkey, Indonesia, India, and Bangladesh–import substantial quantities of essential goods from Ukraine, including wheat, corn, sunflower oil, iron ore, and chemicals, which are crucial for their food security, energy supply, and industrial production. The war in Ukraine has disrupted these vital trade flows, compelling these nations to seek alternative suppliers, often at higher costs and with logistical challenges. For instance, Egypt purchases wheat from Ukraine, one of the leading producers of premium wheat worldwide (Glauben et al., 2022). Ukraine also exports grain, wheat, and sunflower oil to Turkey. Indonesia purchases coal from Ukraine, whereas India buys iron ore, timber, and chemicals. In contrast, Bangladesh imports agricultural items such as wheat, maize, and rice, as well as iron and steel, from Ukraine. These nations acquire items from Ukraine not just for their quality, but also because they are reasonably inexpensive. Moreover, those countries suffer more than others due to shortages of Ukrainian supplies (Fris et al., 2019).
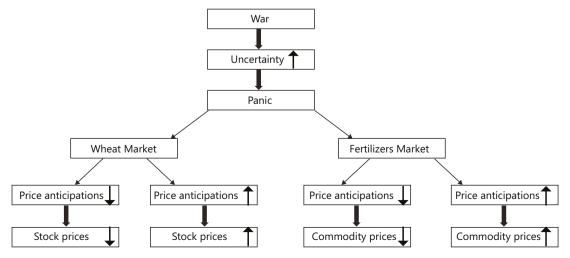

Figure 1. The effect of war on the markets (source: created by the author)

Egypt's geopolitical stability is critical to trade with Ukraine. Political developments and regional stability may have an impact on Egypt's agricultural imports from Ukraine (World Bank, 2025). Egyptian trade preferences may be influenced by its Middle Eastern connections and partnerships. Diplomatic relations between Ukraine and these countries may have an impact on agricultural trade patterns. The geopolitical situation of Eastern Europe and the Black Sea region may have an impact on trade between Ukraine and Turkey. Tensions or cooperation between NATO members and surrounding nations may have an impact on economic relationships (Hussein & Knol, 2023).

Energy geopolitics, notably gas supply, may have an impact on Ukraine-Turkey relations. Energy cooperation agreements may have ramifications for broader economic relations, such as agricultural trade. Indonesia's role in Southeast Asia, as well as its relationships with surrounding countries, have the potential to affect commerce. Ukraine's diplomatic engagement with regional players may have an impact on agricultural commerce with Indonesia (Ben Hassen & El Bilali, 2022).

Ukraine's engagement with the Association of Southeast Asian Nations (ASEAN) has the potential to influence commercial relations with Indonesia in the broader regional context. The geopolitical stability in North Africa, including India, is significant. Political stability and turmoil can influence trade patterns. Ukraine's diplomatic efforts in the Mediterranean region may have an impact on trade partnerships. India's proximity to the European Union (EU), as well as Ukraine's participation with the EU, may influence trade concerns, particularly if both areas enter into collaborative agreements.

The geopolitical developments in South Asia have the potential to influence commerce between Ukraine and Bangladesh. Relations with neighboring nations and regional stability may have an impact on Bangladesh's trading decisions. Ukraine's geopolitical ties to the Indian Ocean, especially geopolitical affiliations, may influence economic dynamics with Bangladesh (Rose et al., 2023). The impact of the Ukrainian war on individual agricultural sectors in Egypt, Turkey, Indonesia, India, and Bangladesh varies depending on the nature of their trade links, reliance on Ukrainian agricultural products, and general agricultural economic resiliency.

The crisis in Ukraine has exacerbated pre-existing tensions in the agricultural commodities market. Prices for commodities such as cereals and vegetable oils have reached all-time highs since late 2021, surpassing even the levels seen during the global food price problems more than a decade ago. The entry of the Russian military into Ukraine has pushed prices further higher. This has mostly impacted import-dependent countries in the Middle East and North Africa (MENA) area and Sub-Saharan Africa, which rely largely on Russian and Ukrainian wheat (Nechyporenko et al., 2022).

Due to supply chain disruptions and shortages of raw materials brought on by the violence, every manufacturer is now forced to reevaluate how to achieve sustainability and viability. Ukraine was one of the world's top exporters of agricultural products, therefore the war has had a catastrophic effect on the world's food markets. Ukraine has seen a sharp decline in agricultural productivity as a result of the war's severe damage to its transportation, storage, and agricultural infrastructure (Shubravska & Prokopenko, 2022). Global economic difficulties have also been exacerbated by rising energy prices brought on by the war, which have increased the cost of production and logistics. Global trade and food security are significantly impacted by the war's effects on supply chains and logistics. Furthermore, the protracted war emphasizes how urgent international cooperation is needed to restore infrastructure, stabilize supply lines, and lessen the world food crisis. The theoretical and applied perspectives on the relationship between war and trade highlight the complex interplay between geopolitical conflicts and economic interdependence, particularly in the agricultural sector. The war in Ukraine exemplifies this dynamic, demonstrating how armed conflicts can severely disrupt agricultural productivity, trade flows, and global food security. The disruption of supply chains and the resulting shortages and price inflation underscore the vulnerability of import-dependent countries to geopolitical shocks. The ongoing crisis in Ukraine not only exacerbates existing tensions in global agricultural markets but also necessitates urgent international cooperation to mitigate its far-reaching impacts on food security and economic stability worldwide.

3. Methodology

The research seeks to clarify the widespread impacts of the war in Ukraine on international trade patterns and forecasts. Examining the immediate shifts in commodity trade flows after the start of the war is one way to do this. Understanding the changing dynamics of global marketplaces and predicting future trends in international trade requires this kind of research. The research was carried out based on trade routes between Ukraine and the most reliant countries for Ukrainian goods in the agricultural sector: Turkey, Indonesia, Bangladesh, Egypt, and India.

Data on fertilizer exports and production from Russia and Ukraine prior to and following the start of the war will be gathered for this research. Given that these two nations are significant participants in the global fertilizer business this data is crucial (Guénette et al., 2022). Recognizing the shifts in export and production trends will demonstrate the magnitude of the war's disruption. Monitoring the volatility of fertilizer prices worldwide is another crucial data collection. These prices have changed significantly as a result of the war, which has affected the cost of agricultural output and, eventually, food prices. Assessing market stability and affordability trends will be made easier by gathering this data from financial reports, market evaluations, and pertinent internet sources.

Additionally, the work will collect import statistics for nations that rely significantly on fertilizers from Ukraine and

Russia (Rosstat, 2025). Finding the areas most impacted by supply disruptions and the ensuing effects on their agricultural sectors depends heavily on this data. To determine the direct effect of fertilizer shortages on agricultural production, crop yield data from nations that depend on imports of fertilizer from Russia and Ukraine is required. International agricultural organizations, national statistics, and agricultural publications are some of the sources of this data.

Correlation analysis and multivariate regression analysis are especially well-suited for this research because of the cases, the intricacy of trade dynamics, and the complicated effects of the war in Ukraine. This approach makes it possible to look at several independent variables at once and understand how they all work together to influence dependent variables like pricing or trade volumes. Additionally, it aids in confounding factor control, guaranteeing that the effects shown are indeed caused by the independent variables of interest like the war rather than by other unrelated factors. For a comprehensive knowledge of the trade consequences, multivariate regression also sheds light on the type and strength (positive or negative) of correlations between different factors. Additionally, it assists in forecasting future trends using past data, providing insightful estimates that can guide strategic planning and policy decisions.

The correlation coefficient was found using the formula of Pearson:

$$r = \frac{n\sum XY - \sum x \sum Y}{\sqrt{\left(n\sum X^2 - (\sum X)^2\right)(n\sum Y^2 - \left(\sum Y\right)^2)}}, \qquad (1)$$

where X – independent variable; Y – dependent variable; n – sample size.

By computing the coefficients of the independent variables to ascertain their influence on the dependent variable, multivariate regression is a statistical analysis technique that examines the relationship between a dependent variable and several independent factors. Multiple linear regression is used when there is one dependent variable and two or more independent variables. In multiple linear regression, the formula for the line of greatest fit is:

$$Y = b_0 + b_1X_1 + b_2X_2 + \ldots + b_pX_p + \varepsilon, \qquad (2)$$

where Y – predicted or expected value; X_p – independent variable; b_p – estimated regression coefficient.

Two of the biggest manufacturers of fertilizer worldwide are Russia and Ukraine. Monitoring production data from before and after the war is crucial to comprehending the output disruption. This information will be useful in estimating the war's immediate effects on the fertilizer sector and spotting patterns that might affect supplies globally. The study intends to evaluate how disruptions have impacted fertilizer availability globally by looking at export statistics. This information will shed light on shifts in trade flows and dependencies by demonstrating the degree to which important trading partners have been affected. Price data analysis provides a clear picture of the war-induced market volatil-

ity. Food prices grow as a result of rising agricultural input costs brought on by rising fertilizer prices. It is essential to comprehend these processes in order to assess the financial effects on different stakeholders. In order to sustain good agricultural yields, fertilizer is essential (Ericksen, 2008). This information will be useful in assessing the impact of fertilizer scarcity on agricultural output. By comparing agricultural yield data from before and after the war, it is possible to identify areas that are most at risk of food poverty because of the decreased availability of fertilizer. More comprehensive economic data makes it easier to place the study in the broader framework of worldwide economic trends. While agricultural commodity prices represent the indirect effects on food markets and food security, GDP and inflation data can show the economic strain on countries that are severely affected by fertilizer shortages.

Thus, the goal is to present a thorough and nuanced picture of how the war in Ukraine has affected global international trade trends by combining insights from previous research and using multivariate regression analysis results are reliable and useful since this approach not only makes use of the body of existing information but also applies strong statistical rigor to the research.

The correct hypotheses were developed following the examination of the selected data:

Hypothesis 1: The ongoing war in Ukraine has significantly disrupted the import of critical agricultural commodities, particularly fertilizers and wheat, from both Ukraine and Russia to major importing countries. This disruption is primarily attributed to the destruction of transportation infrastructure, logistical bottlenecks, and stringent trade restrictions imposed as a result of the conflict. Consequently, there has been a substantial reduction in the volume of these essential imports, which are vital for the agricultural sectors and food security of importing nations. This hypothesis posits that the war's direct impact on the physical movement of goods and trade channels has led to a significant decline in the availability of fertilizers and wheat from these key exporting countries.

Hypothesis 2: The war in Ukraine has led to a significant reconfiguration of import patterns among countries that were previously heavily reliant on Ukrainian and Russian agricultural exports. Specifically, nations such as Egypt, Turkey, Indonesia, Bangladesh, and India have witnessed a notable decline in their imports of key commodities like wheat and fertilizers from these regions. This shift is driven by the need to secure alternative sources of supply in response to the disruptions caused by the conflict. However, this reconfiguration has not been without challenges, as these countries have had to navigate new trade routes and establish relationships with alternative suppliers, often at higher costs and with increased logistical complexities.

Hypothesis 3: The disruptions in the import of critical agricultural goods from Ukraine and Russia have exacerbated food insecurity in countries heavily reliant on these imports. The decline in the availability of essential commodities such as wheat and fertilizers has resulted in reduced

food production and increased prices, particularly in regions with limited domestic agricultural capacity. This hypothesis argues that the war's impact on the supply of key agricultural inputs has created a ripple effect, leading to shortages and higher food costs, which disproportionately affect vulnerable populations in import-dependent countries.

These hypotheses are grounded in the context of the war in Ukraine and its broad impacts on international trade, especially in the agricultural and fertilizer sectors. They align with the thematic elements and observed trends presented in your research. That's why this type of data was chosen, and this hypothesis was analyzed, for that the multivariate regression analysis was needed for the research.

4. Results

For 12 years, from 2012 to 2023, the study looked at the economic factors influencing import levels for each of the chosen countries. The variables' definitions, measurements, and data sources are shown in Table 1.

By investigating and monitoring these factors, the impact of war can be indicated for each country, which will define the temporal changes in trade trend flows of these commodities. The analysis is essential for confirming theories and determining how closely trade routes and pricing interruptions are related. Examining the relationship between fertilizer costs and agricultural output, for instance, might show how strongly shifts in one factor affect the other. This understanding enables the research to create well-informed predictions and recommendations by quan-

tifying the impact of the war on food security and economic stability in the impacted nations. The correlation research for Bangladesh, Egypt, Indonesia, India, and Turkey looks at the relationship between their import levels from Russia and Ukraine and several aspects such as fertilizer prices, wheat prices, fertilizer usage, GDP growth, inflation, and overall import levels. Each table shows how the war has affected trade dynamics by highlighting the connections between imports and these dependent factors. The correlation analysis for every nation was then carried out and presented in Tables 2, 3, 4, 5, and 6.

The correlation analysis reveals the relationship between Bangladesh's import levels and several dependent factors, highlighting the effects of global and Ukraine and Russia-specific trends on trade. Notable findings include:

Fertilizer Prices (Ukraine −0.69, Russia −0.57): Strong negative correlations show that rising fertilizer prices from both Ukraine and Russia lead to a significant reduction in Bangladesh's imports.

Wheat Prices (Ukraine −0.58, Russia −0.63): Similarly, rising wheat prices from both countries negatively impact imports, reflecting the sensitivity of Bangladesh's trade to price fluctuations.

Fertilizer Consumption % (Ukraine 0.03, Russia 0.58): A weak positive correlation for Ukraine and a moderately positive one for Russia suggests that increased fertilizer consumption is more closely linked to stable Russian imports.

GDP Growth (Ukraine −0.15, Russia 0.14): A slight negative correlation with Ukraine and a positive one with Russia shows some variability in how economic growth impacts imports from each country.

Inflation (Ukraine 0.78, Russia 0.01): Inflation has a strong positive correlation with imports from Ukraine, indicating that inflationary pressures push up Bangladesh's reliance on Ukrainian goods, while Russia's impact is minimal.

General Import Levels (Ukraine −0.53, Russia 0.60): The negative correlation with Ukraine suggests declining imports as disruptions increase, while Russia shows a positive trend, indicating stable trade relations.

Table 1. Definition of variables, used for the research (source: created by author)

Variable	Measurement	Source
Imports levels	US$	(World Bank, 2025)
Wheat Prices (Ukraine/Russia)	USD per Kilo	(Rosstat, 2025; Ukrstat, 2025)
Fertilizer Prices (Ukraine/Russia)	USD per Kilo	(Rosstat, 2025; Ukrstat, 2025)
Fertilizer consumption (% of fertilizer production)	%	(World Bank, 2025)
GDP growth	Annual %	(World Bank, 2025)
Inflation	GDP deflator (annual %)	(World Bank, 2025)
General Import levels	US$	(World Bank, 2025)
Fertilizer Consumption	Kilograms per Hectare of Arable Land	(World Bank, 2025)
Wheat Prices (World)	USD per Kilo	(World Bank, 2025)
Fertilizer Prices (World)	USD per Kilo	(World Bank, 2025)
Global fertilizer exports % of world export	%	(World Bank, 2025)

Table 2. Correlation between Bangladesh imports (Y) and dependent factors (X) for Ukraine and Russia (source: created by author)

Indicators	Data for Ukraine	Data for Russia
Fertilizer Prices (Ukraine/Russia)	−0.69	−0.57
Wheat Prices (Ukraine/Russia)	−0.58	−0.63
Fertilizer consumption %	0.03	0.58
GDP growth	−0.15	0.14
Inflation	0.78	0.01
General Import levels	−0.53	0.60
Fertilizer Consumption	−0.33	0.52
Wheat Prices (World)	−0.20	0.02
Fertilizer Prices (World)	−0.34	0.73
Global fertilizer exports	−0.52	0.35

Global Fertilizer Exports (Ukraine –0.52, Russia 0.35): Bangladesh's imports are negatively impacted by Ukraine's reduced global exports, while Russian exports show a moderate positive correlation, indicating resilience in Russia's supply chains.

Russia has a stronger positive impact on Bangladesh's import levels, especially for fertilizer consumption and general imports, whereas Ukraine's disruptions (e.g., fertilizer and wheat prices) significantly reduce imports, making Russia the more stable trading partner for Bangladesh.

Following that, the correlation for Egypt import levels was performed:

Table 3. Correlation between Egypt imports (Y) and dependent factors (X) for Ukraine and Russia (source: created by author)

Indicators	Data for Ukraine	Data for Russia
Fertilizer Prices (Ukraine/Russia)	0.04	0.67
Wheat Prices (Ukraine/Russia)	0.57	0.65
Fertilizer consumption %	–0.66	0.79
GDP growth	–0.59	0.62
Inflation	–0.55	0.19
General Import levels	0.18	0.56
Fertilizer Consumption	–0.51	0.08
Wheat Prices (World)	0.16	0.06
Fertilizer Prices (World)	–0.12	0.15
Global fertilizer exports	0.36	0.17

Fertilizer Prices (0.04, 0.67): Egypt's imports are minimally impacted by Ukraine's fertilizer prices, while higher prices from Russia correlate with increased imports, suggesting stronger trade ties.

Wheat Prices (0.57, 0.65): Both countries show strong positive correlations, meaning higher wheat prices lead to increased imports.

Fertilizer Consumption % (–0.66, 0.79): A negative correlation for Ukraine shows reduced imports as fertilizer consumption decreases, whereas Russia shows a positive correlation, indicating more stable import levels.

GDP Growth (–0.59, 0.62): Egypt's GDP growth correlates negatively with Ukraine but positively with Russia, suggesting divergent economic relationships.

Inflation (–0.55, 0.19): Inflation negatively affects imports from Ukraine, but has a smaller impact on Russian imports.

General Import Levels (0.18, 0.56): Egypt's general import levels show a stronger positive correlation with Russia than Ukraine, indicating more stable imports from Russia despite disruptions.

In general, Russia has a greater positive impact on Egypt's imports, particularly in fertilizer and wheat prices, while Ukraine's imports are more negatively affected by inflation and GDP growth, indicating stronger trade ties with Russia.

The correlation analysis of Indonesian import levels is provided in Table 4.

Table 4. Correlation between Indonesia imports (Y) and dependent factors (X) for Ukraine and Russia (source: created by author)

Indicators	Data for Ukraine	Data for Russia
Fertilizer Prices (Ukraine/Russia)	–0.61	0.78
Wheat Prices (Ukraine/Russia)	0.13	0.2
Fertilizer consumption %	–0.26	–0.01
GDP growth	–0.65	0.60
Inflation	–0.53	0.72
General Import levels	–0.67	0.03
Fertilizer Consumption	–0.09	0.14
Wheat Prices (World)	–0.08	–0.07
Fertilizer Prices (World)	–0.40	–0.08
Global fertilizer exports	–0.34	0.59

Fertilizer Prices (–0.61, 0.78): A strong negative correlation with Ukraine and a positive with Russia shows that Indonesia's fertilizer imports drop significantly from Ukraine but increase from Russia.

Wheat Prices (0.13, 0.20): Both show weak positive correlations, with minor impacts on Indonesia's imports.

Fertilizer Consumption % (–0.26, –0.01): Minimal impact on import behavior from either country's fertilizer consumption.

GDP Growth (–0.65, 0.60): A strong negative correlation with Ukraine indicates economic strain, while a positive correlation with Russia suggests a stable trade relationship.

Inflation (–0.53, 0.72): Inflation negatively affects imports from Ukraine, but positively correlates with Russia, indicating more resilient trade with Russia.

General Import Levels (–0.67, 0.03): A strong negative correlation with Ukraine reflects declining imports, while Russia's imports remain stable.

Global Fertilizer Exports (–0.34, 0.59): Indonesia's imports from Ukraine drop with reduced global exports, but Russia's remain positively correlated with global export levels.

Indonesia's imports are more positively correlated with Russia's, especially for fertilizer prices and GDP growth, while Ukraine's disruptions (fertilizer prices and GDP) result in significant reductions in import levels, showing a stronger reliance on Russia.

India's correlation model is presented below:

Table 5. Correlation between India imports (Y) and dependent factors (X) for Ukraine and Russia (source: created by author)

Indicators	Data for Ukraine	Data for Russia
Fertilizer Prices (Ukraine/Russia)	0.70	0.65
Wheat Prices (Ukraine/Russia)	0.79	0.58
Fertilizer consumption %	0.75	0.24
GDP growth	–0.07	0.21
Inflation	0.84	0.70
General Import levels	0.05	0.84
Fertilizer Consumption	–0.30	0.43
Wheat Prices (World)	0.36	0.79
Fertilizer Prices (World)	0.17	0.88
Global fertilizer exports	0.77	0.11

Fertilizer Prices (0.70, 0.65): Strong positive correlations suggest that higher fertilizer prices from both countries lead to increased imports, indicating India's dependence on both suppliers.

Wheat Prices (0.79, 0.58): High wheat prices are strongly associated with increased imports from both countries.

Fertilizer Consumption % (0.75, 0.24): A strong positive correlation with Ukraine shows that India's imports increase significantly with higher fertilizer consumption, while Russia's impact is weaker.

Inflation (0.84, 0.70): Inflation strongly correlates with higher imports from both Ukraine and Russia, indicating that inflation drives India's trade with these countries.

General Import Levels (0.05, 0.84): Minimal correlation with Ukraine but a strong positive correlation with Russia shows India's growing dependence on Russian imports.

Global Fertilizer Exports (0.77, 0.11): India's imports are strongly influenced by fertilizer exports from Ukraine, while Russia's exports show a weaker impact.

India's imports are strongly influenced by both Ukraine and Russia, but Russia's impact is slightly more pronounced in general import levels and wheat prices, indicating a stronger trade relationship with Russia amidst rising inflation.

Table 6. Correlation between Turkey imports (Y) and dependent factors (X) for Ukraine and Russia (source: created by author)

Indicators	Data for Ukraine	Data for Russia
Fertilizer Prices (Ukraine/Russia)	0.66	0.77
Wheat Prices (Ukraine/Russia)	0.11	0.68
Fertilizer consumption %	0.20	0.14
GDP growth	0.13	0.14
Inflation	−0.61	−0.30
General Import levels	−0.26	0.02
Fertilizer Consumption	−0.61	−0.48
Wheat Prices (World)	−0.08	0.18
Fertilizer Prices (World)	−0.01	0.52
Global fertilizer exports	0.70	0.30

Fertilizer Prices (0.66, 0.77): Both Ukraine and Russia show strong positive correlations, indicating that rising fertilizer prices lead to increased imports from both countries.

Wheat Prices (0.11, 0.68): Minimal impact from Ukraine's wheat prices, but a strong positive correlation for Russia suggests that Turkey imports more wheat as Russian prices rise.

Fertilizer Consumption % (0.20, 0.14): Weak positive correlations for both countries indicate little influence on import patterns.

GDP Growth (0.13, 0.14): Almost negligible correlations suggest the limited influence of economic growth on imports.

Inflation (−0.61, −0.30): Negative correlations indicate that inflation dampens imports from both Ukraine and Russia.

Global Fertilizer Exports (0.70, 0.30): Turkey's imports from Ukraine are positively influenced by global exports, while Russia's have a weaker positive correlation.

Turkey maintains relatively stable trade with both Ukraine and Russia, but Russia's impact is stronger in wheat prices and global fertilizer exports, making it a more reliable source for key imports.

To sum up, the analysis shows varying impacts of the Russia-Ukraine war on the import levels of these countries. Overall, Bangladesh and Indonesia experience stronger negative impacts from rising prices and supply disruptions from Ukraine, while Russia's exports remain more stable, even showing positive correlations with rising global prices. Egypt and India have stronger trade ties with Russia, particularly for fertilizers and wheat, with higher prices driving increased imports. Turkey shows resilience in maintaining stable trade with both Ukraine and Russia, although it appears more affected by Russian wheat prices. Data that showed weak or negligible correlations were excluded from subsequent stages of research, as they failed to demonstrate significant relationships between the dependent variables and import levels. For example, in the case of Indonesia, variables such as fertilizer consumption percentages (−0.26 for Ukraine and −0.01 for Russia) and wheat prices (−0.08 for Ukraine and −0.07 for Russia) exhibited minimal impact, suggesting an insignificant role in shaping the trade patterns of the country. Likewise, in Turkey, fertilizer consumption (−0.61 for Ukraine and −0.48 for Russia) and GDP growth (0.13 for Ukraine and 0.14 for Russia) had modest connections, making them less pertinent for examining the overall dynamics of trade.

A more intricate model is required for India and Turkey due to the influence of worldwide wheat prices and their dependence on shipments from Russia and Ukraine. Understanding how local inflation, changes in international trade, and agricultural output interact in these nations is essential to comprehending the entire economic effects of the war. In further research, a multivariate regression model will be used, which will be based on significant correlation and pair-wise regression coefficients. There are going to be 10 multivariate regression models for all 5 countries and price data from Ukraine and Russia respectfully:

$$Y = 2304917,4 + 571590333,7 * X_1 + 638621001,5 * X_2 + 0,077 * X_3 − 94379276,6 * X_4, \quad (3)$$

where Y − Bangladesh imports; X_1 − Fertilizer Prices (Ukraine); X_2 − Wheat Prices (Ukraine); X_3 − General Import levels; X_4 − Global fertilizer exports % of world export Ukraine.

The multivariate regression model shows a high R-square (0.93) for fertilizer prices from Ukraine, which explains a significant portion of the variability in Bangladesh's imports. The P-values of 0.05 and below indicate that fertilizer and wheat prices from Ukraine, along with general import levels, significantly impact Bangladesh's

Table 7. R-square and P-value for multivariate regression of Bangladesh imports (Ukraine perspective) (source: created by author)

Indicator	R-square	P-value
Fertilizer Prices (Ukraine)	0.93	0.05
Wheat Prices (Ukraine)		0.04
General Import levels		0.04
Global fertilizer exports % of world export Ukraine		0.02

import levels. Global fertilizer exports also show a significant impact but to a lesser degree. The regression model indicates that higher fertilizer and wheat prices from Ukraine paradoxically lead to increased imports by Bangladesh, likely due to anticipatory buying and contractual obligations, as evidenced by the positive coefficients of 571,590,333.7 and 638,621,001.5 respectively. Similarly, higher global fertilizer exports from Ukraine, despite reducing Bangladesh's imports due to supply constraints (coefficient of –94,379,276.6), highlight the country's efforts to diversify its import sources amidst geopolitical tensions. These findings suggest that while price increases drive higher import volumes in the short term, supply disruptions ultimately force a reconfiguration of import patterns towards more stable suppliers.

The war has severely disrupted Ukraine's fertilizer and wheat supply to Bangladesh, significantly affecting imports. The high R-square value shows that fertilizer prices and general import levels are critical variables. The model suggests Bangladesh's heavy reliance on Ukrainian agricultural exports.

$$Y = 829271458,5 - 3245118958,07 * X_1 - 2331021878,3 * X_2 + -0,36 * X_3 - 1335866514,1 * X_4, \quad (4)$$

where Y – Bangladesh imports; X_1 – Fertilizer Prices (Russia); X_2 – Wheat Prices (Russia); X_3 – General Import levels; X_4 – Fertilizer Prices (World).

Table 8. R-square and P-value for multivariate regression of Bangladesh imports (Russia perspective) (source: created by author)

Indicator	R-square	P-value
Fertilizer Prices (Russia)	0.90	0.01
Wheat Prices (Russia)		0.05
General Import levels		0.04
Fertilizer Prices (World)		0.05

The R-square (0.90) indicates a substantial correlation between Bangladesh's imports and the prices of Russian wheat and fertilizer. Fertilizer prices have a considerable impact, as indicated by the P-value of 0.01. The P-values near 0.05 show that imports are also influenced by general import levels and worldwide fertilizer prices. The regression model demonstrates that higher fertilizer and wheat prices from Russia lead to a significant decrease in Bangladesh's imports, as the country seeks more affordable

alternatives or reduces consumption due to cost constraints. This is evidenced by the large negative coefficients of –3,245,118,958.07 and –2,331,021,878.3 for fertilizer and wheat prices, respectively. Additionally, higher global fertilizer prices further contribute to the decline in imports from Russia, highlighting the impact of worldwide price trends on Bangladesh's import decisions. These findings suggest that while Bangladesh relies heavily on Russian imports, price increases drive a reconfiguration of import patterns towards more cost-effective options.

The fact that Bangladesh depends on Russia for wheat and fertilizers emphasizes how important Russia is to Bangladesh's import economy. Bangladesh's import volumes are significantly impacted by fertilizer prices in Russia and around the world. This model emphasizes how crucial Russian agricultural exports are to Bangladesh's ability to maintain steady imports.

$$Y = 65600271,7 - -663125,61 * X_1 - 3371935,4 * X_2 + -424055,1 * X_3, \quad (5)$$

where Y – Egypt imports; X_1 – Fertilizer consumption (% of fertilizer production); X_2 – GDP growth; X_3 – Inflation.

Table 9. R-square and P-value for multivariate regression of Egypt imports (Ukraine perspective) (source: created by author)

Indicator	R-square	P-value
Fertilizer consumption (% of fertilizer production)	0.72	0.03
GDP growth		0.04
Inflation		0.05

According to the fertilizer consumption R-square (0.72), fertilizer use and GDP growth have a moderate impact on Egypt's imports. The statistical significance of GDP growth (0.04) and inflation (0.05) is indicated by their respective P-values. The regression model reveals that higher fertilizer consumption as a percentage of production leads to a decrease in Egypt's imports from Ukraine, indicating a move towards self-sufficiency. Similarly, higher GDP growth and inflation also contribute to a reduction in imports, suggesting that economic growth and inflationary pressures reduce the need and affordability of imports from Ukraine. These findings highlight the interplay between domestic economic factors and import decisions, demonstrating that Egypt's reliance on Ukrainian imports is sensitive to changes in both agricultural production and broader economic conditions.

Given its reliance on fertilizers and GDP growth, Egypt's imports, particularly those from Ukraine, are greatly impacted by any disruptions to fertilizer availability or economic growth. These results highlight Egypt's economic susceptibility as a result of its dependence on Ukraine.

$$Y = 6072763,6 + 79384773,6 * X_1 - 2204587,0 * X_2, \quad (6)$$

where Y – Egypt imports; X_1 – Fertilizer Prices (Russia); X_2 – GDP growth.

Table 10. R-square and P-value for multivariate regression of Egypt imports (Russia perspective)

Indicator	R-square	P-value
Fertilizer Prices, Russia	0.75	0.04
GDP growth		0.04

The model presents an R-square (0.75), suggesting that Russia's fertilizer prices significantly affect Egypt's imports. The P-value of 0.04 further confirms the significance of this variable. Egypt's import levels are strongly influenced by Russian fertilizer prices. Russia continues to be a critical supplier, and disruptions in fertilizer supply from Russia would significantly affect Egypt's agricultural imports. The regression model demonstrates that higher fertilizer prices from Russia lead to increased imports by Egypt, highlighting the country's reliance on Russian fertilizers despite price increases. This is evidenced by the large positive coefficient of 79,384,773.6 for fertilizer prices. Conversely, higher GDP growth leads to a decrease in imports, suggesting that economic growth enables Egypt to reduce its dependency on Russian imports, possibly by investing in domestic agriculture or seeking alternative suppliers. These findings underscore the complex interplay between economic conditions and import decisions, indicating that Egypt's import patterns are sensitive to both global price trends and domestic economic performance.

$$Y = 120922884,8 - 356316035,7 * X_1 - 11587248,3 * X_2, \quad (7)$$

where Y – Indonesia imports; X_1 – Fertilizer Prices (Ukraine); X_2 – GDP growth.

Table 11. R-square and P-value for multivariate regression of Indonesia imports (Ukraine perspective) (source: created by author)

Indicator	R-square	P-value
Fertilizer Prices (Ukraine)	0.54	0.04
GDP growth		0.05

The R-square (0.54) suggests a moderate impact of Ukrainian fertilizer prices and GDP growth on Indonesia's imports. However, the P-values of 0.04 and 0.05 indicate that both variables are significant in explaining the changes in import levels. Ukrainian fertilizer prices significantly affect Indonesia's import levels, but the relationship is less pronounced compared to other countries. Indonesia appears less reliant on Ukraine for fertilizers but still faces moderate disruptions due to the war. The regression model reveals that higher fertilizer prices from Ukraine lead to a substantial decrease in Indonesia's imports, indicating the country's sensitivity to price changes and its ability to adjust import levels in response to market conditions. Additionally, higher GDP growth contributes to a reduction in imports, suggesting that economic growth enables Indonesia to reduce its dependency on Ukrainian imports, possibly by investing in domestic agriculture or seeking alternative suppliers. These findings highlight the interplay

between economic factors and import decisions, demonstrating that Indonesia's reliance on Ukrainian imports is influenced by both global price trends and domestic economic performance.

$$Y = 3930538821,7 + 8421187,7 * X_1 - 143498027,0 * X_2 + 141416379,8 * X_3 - 14705223,6 * X_4, \quad (8)$$

where Y – Indonesia imports; X_1 – Fertilizer consumption (% of fertilizer production); X_2 – GDP growth; X_3 – Inflation; X_4 – Global fertilizer exports % of world export Russia.

Table 12. R-square and P-value for multivariate regression of Indonesia imports (Russia perspective) (source: created by author)

Indicator	R-square	P-value
Fertilizer consumption (% of fertilizer production)	0.76	0.05
GDP growth		0.04
Inflation		0.06
Global fertilizer exports % of world export Russia		0.03

The R-square (0.76) indicates that Russia's fertilizer consumption and exports have a strong influence on Indonesia's imports. P-values below 0.05 for most factors show that they are statistically significant. The regression model shows that higher fertilizer consumption in Indonesia leads to increased imports from Russia, highlighting the complementary nature of domestic consumption and imports. Conversely, higher GDP growth reduces imports, suggesting that economic growth allows Indonesia to decrease its reliance on Russian imports. Interestingly, inflation has a positive effect on imports, possibly due to the relative attractiveness of foreign goods during inflationary periods. Additionally, as Russia's share of global fertilizer exports increases, Indonesia's imports decrease, indicating a potential shift in global trade dynamics or supply constraints. These findings underscore the complex interplay between economic factors and import decisions, demonstrating that Indonesia's reliance on Russian imports is influenced by both domestic consumption patterns and global trade trends.

Russia's fertilizer exports play a critical role in Indonesia's import ecosystem. The model underscores the heavy dependence of Indonesia on Russia's agricultural exports.

$$Y = 91426399,6 - 1828173,0 * X_1 + 634607920,46 * X_2, \quad (9)$$

where Y – India imports; X_1 – Fertilizer consumption (% of fertilizer production); X_2 – Global fertilizer exports % of world export Ukraine.

Table 13. R-square and P-value for multivariate regression of India imports (Ukraine perspective) (source: created by author)

Indicator	R-square	P-value
Fertilizer consumption (% of fertilizer production)	0.58	0.02
Global fertilizer exports % of world export Ukraine		0.02

The R-square (0.58) indicates that India's imports are moderately impacted by Ukrainian fertilizer exports. The P-values of 0.02 show that both variables are significant. The regression model reveals that higher domestic fertilizer consumption in India leads to a decrease in imports from Ukraine, highlighting the country's efforts to reduce dependency on foreign suppliers. Conversely, as Ukraine's share of global fertilizer exports increases, India's imports from Ukraine also increase, underscoring India's reliance on Ukrainian fertilizers. These findings suggest that while India is working towards self-sufficiency in fertilizer production, it remains significantly dependent on Ukraine for its fertilizer imports. The model highlights the sensitivity of India's import patterns to changes in Ukraine's global export position, indicating that any disruptions in Ukraine's fertilizer exports could have a substantial impact on India's agricultural sector.

India's imports are influenced by Ukrainian fertilizer exports, though less significantly compared to other countries. Nevertheless, any disruptions in Ukraine's exports pose a risk to India's agricultural sector:

$$Y = 596377969,67 + 5782020775,1 * X_1 + 0,093 * X_2 + 6522342810,9 * X_3 + 5207112150,3 * X_4, \tag{10}$$

where Y – India imports; X_1 – Fertilizer Prices (Russia); X_2 – General Import levels; X_3 – Wheat Prices (World); X_4 – Fertilizer Prices (World).

Table 14. R-square and P-value for multivariate regression of India imports (Russia perspective) (source: created by author)

Indicator	R-square	P-value
Fertilizer Prices (Russia)	0.88	0.04
General Import levels		0.03
Wheat Prices (World)		0.05
Fertilizer Prices (World)		0.04

The R-square (0.88) demonstrates a very strong relationship between fertilizer prices (Russia) and India's import levels, implying that rising fertilizer prices from Russia significantly affect India's agricultural imports. The P-value (0.04) for fertilizer prices confirms its statistical significance. Wheat prices globally also show a significant impact with a P-value of 0.05, indicating that global price shifts in wheat influence India's import decisions. Additionally, global fertilizer prices exhibit a significant effect (P-value of 0.04), further reflecting how interconnected India's agricultural imports are with both Russian exports and the global market.

India is susceptible to interruptions in these supply networks because of its heavy reliance on Russian wheat and fertilizer. India's food security is extremely vulnerable to changes in global agricultural prices, as seen by the close correlation between wheat prices and imports from India. This model emphasizes the significance of Russian fertilizer shipments to India and the agricultural markets' worldwide interdependence.

$$Y = 36445017,9 + 550783085,1 * X_1 + 501629401,1 * X_2, \tag{11}$$

where Y – Turkey imports; X_1 – Fertilizer Prices (Ukraine); X_2 – Global fertilizer exports % of world export Ukraine.

Table 15. R-square and P-value for multivariate regression of Turkey imports (Ukraine perspective) (source: created by author)

Indicator	R-square	P-value
Fertilizer Prices (Ukraine)	0.62	0.05
Global fertilizer exports % of world export Ukraine		0.02

The correlation between Turkish import levels and Ukrainian fertilizer prices is reasonably significant, as indicated by the R-square (0.62). The fertilizer prices' significance in influencing Turkey's imports is confirmed by the P-value (0.05). Turkey's import levels are significantly impacted by disruptions in Ukraine's global fertilizer exports, as evidenced by the statistically substantial global proportion of Ukraine's fertilizer exports (P-value of 0.02).

This model makes it evident how dependent Turkey is on Ukrainian fertilizers and how disruptions in Ukraine's agricultural exports have a substantial effect on Turkey's capacity to keep import levels steady. Turkey's agricultural industry is directly impacted by any supply chain interruptions or price hikes from Ukraine, underscoring Turkey's susceptibility to the geopolitical unrest in Ukraine.

$$Y = 242778083,3 + 2493250124,8 * X_1 - 882566015,4 * X_2 \tag{12}$$

where Y – Turkey imports; X_1 – Fertilizer Prices (Russia); X_2 – Fertilizer Prices (World).

Table 16. R-square and P-value for multivariate regression of Turkey imports (Russia perspective) (source: created by author)

Indicator	R-square	P-value
Fertilizer Prices in Russia	0.55	0.02
Fertilizer Prices (World)		0.04

A moderate association between Russian fertilizer prices and Turkey's import levels is indicated by the R-square (0.55), and the significance of this relationship is highlighted by the P-value of 0.02. Global fertilizer prices have a considerable impact on Turkey's imports as well (P-value of 0.04), indicating that Turkey's import decisions are largely influenced by both Russian and global fertilizer market conditions.

Although Turkey is somewhat dependent on Russia for agricultural inputs, the low impact of Russian fertilizer prices on Turkey's imports indicates that global fertilizer prices have a greater influence on Turkey's import levels. The need for Turkey to diversify its supply sources to reduce the risk of price volatility is highlighted by the twin effects of fertilizer prices in Russia and throughout the world.

The multivariate regression analysis conducted across Bangladesh, Egypt, Indonesia, and India highlights the profound and far-reaching effects of the war between Russia and Ukraine on international agricultural trade. As major suppliers of wheat and fertilizers, the disruptions in exports from both Russia and Ukraine have significantly impacted these importing countries. The high R-square values in the regression models, such as 0.88 for India's imports from Russia, underscore the strong correlation between fertilizer costs and import levels, indicating the war's severe impact on agricultural supply chains. The data reveals that fertilizer prices are a critical factor influencing import levels; for instance, India's reliance on Russian fertilizers is highlighted by the significant impact of any disruptions on its import levels. Similarly, Turkey's dependence on both Russian and Ukrainian fertilizer exports underscores the vulnerability of its agricultural sector to supply chain disruptions. While the war has likely caused global price fluctuations for agricultural commodities, this research focuses on the empirical impact on import levels rather than analyzing global price changes. The study acknowledges that the war has affected production costs in Ukraine and Russia, which may have influenced global prices, but this is not the primary focus of the analysis. Additionally, the research indicates that economic factors such as inflation and GDP growth significantly affect import levels. For example, Egypt's imports from Russia and Ukraine are notably influenced by inflation and economic growth, reflecting the broader economic impact of the war on agricultural trade. The disruptions in wheat and fertilizer supplies have exacerbated food insecurity, particularly in countries like Egypt and Bangladesh that rely heavily on imports. The impact of the war on these essential commodities has increased the risk of food shortages and higher prices, posing significant challenges to food security. In conclusion, the study demonstrates that the war has led to increased costs and uncertainties for importing countries by disrupting the supply of key commodities and affecting import levels. To mitigate these effects, countries should consider diversifying their supply sources and implementing strategic policies to stabilize agricultural trade routes. The findings emphasize the need for international cooperation to address the challenges posed by geopolitical conflicts and ensure food security for vulnerable populations.

5. Conclusions

The results of the study provide strong support for Hypothesis 2, which posits that the war in Ukraine has significantly altered the dynamics of international agricultural trade, forcing countries to seek new suppliers. Nations that were previously dependent on Russian and Ukrainian agricultural exports, including critical commodities like fertilizers and wheat, have been compelled to diversify their trading relationships. For example, Egypt, which relied heavily on Ukrainian wheat, has started importing from alternative sources such as Brazil and India. However, this shift in trade patterns has not only increased logistical costs but also introduced new vulnerabilities into the global agricultural supply chain. While diversification is a necessary strategy, it often means relying on new suppliers who may not be as reliable or cost-effective as the original ones.

The reorganization of international trade has led to increased volatility, as substitute suppliers may face their own challenges with logistics and production capacity. Additionally, geopolitical factors have influenced the establishment of new trade routes and agreements, making the global trade environment more complex and less predictable. The analysis confirms that countries like Bangladesh, Indonesia, and Turkey have had to adapt to these changing realities, often at significant economic and logistical costs.

To understand the broader impact of the Ukraine war on global trade trends, the study conducted a comparative analysis that supports Hypothesis 3. The findings show that the war's disruptions have had a profound effect on global food prices and food security, extending well beyond Europe. The instability in commodity markets, particularly for wheat and fertilizers, has led to sharp price increases, impacting countries that rely heavily on imports from Russia and Ukraine.

For instance, the cost of essential commodities has surged in regions like South Asia and North Africa, where food and agricultural imports are crucial. Egypt's reliance on both Russian and Ukrainian wheat has resulted in skyrocketing food inflation, while Bangladesh has experienced a dramatic rise in fertilizer costs due to scarce international supplies. The comparative research underscores how the war's direct effects on key export commodities–fertilizers, wheat, and maize–have led to sharp price hikes, exacerbating food insecurity in import-dependent regions.

The study also highlights how the global scope of these disruptions has intensified inflationary pressures, particularly in food-importing nations. The world continues to grapple with the consequences of inflation and supply shortages, with the issue of food security becoming increasingly urgent, especially in areas already vulnerable due to economic or climatic conditions. The research's regression models demonstrate that the war in Ukraine has caused significant volatility in global food prices, with both direct (supply chain disruptions) and indirect (price volatility) effects contributing to rising levels of food insecurity.

Through a comprehensive multivariate analysis and literature review, Hypothesis 1 is validated, confirming that the war has caused major disruptions in the global fertilizer supply, leading to reduced agricultural production in import-dependent countries. The sharp rise in fertilizer prices has caused widespread economic hardship, particularly in developing nations, exacerbating food insecurity and creating crises in food production.

The analysis confirms that countries like Bangladesh, Indonesia, and Turkey have had to adapt to these changing realities, often at significant economic and logistical costs.

To address these challenges and mitigate the adverse effects of geopolitical conflicts on global trade and food

security, several practical implementations are recommended. First, governments should actively seek to diversify their import sources by negotiating new trade agreements, forming regional alliances, and providing incentives for domestic companies to explore new suppliers. Second, governments and the private sector should invest in enhancing domestic agricultural productivity through subsidies, infrastructure upgrades, and support for research and development of high-yield crop varieties and sustainable farming practices. Third, governments should establish and maintain strategic food reserves by building buffer stocks, implementing stockpiling policies, and ensuring efficient distribution mechanisms. Fourth, governments and private sector entities should work together to improve supply chain resilience by diversifying transportation routes, investing in logistics infrastructure, and adopting digital technologies. Fifth, governments, private sector entities, and research institutions should promote the adoption of agricultural technologies by supporting aggrotech start-ups, facilitating technology transfer, and offering training programs. Sixth, governments should implement policy reforms to reduce trade barriers by lowering tariffs, streamlining customs procedures, and enhancing transparency in trade policies. Seventh, governments and international organizations should engage in diplomatic efforts to ensure the safe movement of food and agricultural supplies by negotiating ceasefires, coordinating humanitarian aid, and promoting conflict resolution initiatives. Eighth, governments, private sector entities, and farmers should develop comprehensive risk management and contingency plans by conducting regular risk assessments, establishing contingency plans, and building financial resilience through insurance and hedging strategies. By implementing these strategies, countries can enhance their capacity to withstand future disruptions, safeguard food security, and promote sustainable economic growth. The findings of this study underscore the urgent need for proactive measures to address the vulnerabilities in global trade and agricultural systems, particularly in the face of ongoing geopolitical tensions.

In summary, the study shows that the war between Russia and Ukraine has changed global supply networks in ways that could have long-term effects in addition to upsetting agricultural trade. Food shortages, price increases, and greater geopolitical complexity have resulted from the vulnerability of relying on Ukraine and Russia for essential agricultural supplies. To lessen the effects of upcoming geopolitical upheavals, countries must concentrate on diversifying their agricultural trading partners, enhancing domestic production capabilities, and building more robust supply networks. The results of this study shed important light on the interdependence of the world's agricultural markets and the speed at which geopolitical events can destabilize vital industries, with far-reaching effects on both economic stability and food security.

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UKRAINOS KARO ĮTAKA TARPTAUTINĖS PREKYBOS TENDENCIJOMS

T. Kosormyhin

Santrauka

Besitęsiantis karas Ukrainoje, prasidėjęs 2014 metais, smarkiai sutrikdė pasaulinę prekybą, ypač energetikos, žemės ūkio ir tiekimo grandinių srityse. Šiame tyrime ekonominės, prekybos ir geopolitinės teorijos yra derinamos su empiriniais duomenimis, siekiant išanalizuoti konflikto tiesiogines ir ilgalaikes įtakas tarptautinei prekybai. Pagrindiniai tyrimo rezultatai atskleidžia staigų Ukrainos žemės ūkio eksporto mažėjimą, javų ir aliejinių sėklų eksportas nuo 2022 metų sumažėjo daugiau nei 40 %, dar labiau pablogindamas pasaulinį maisto produktų trūkumą. Trąšų eksportas tiek iš Rusijos, tiek iš Ukrainos taip pat smarkiai sumažėjo, dėl to pasaulinės kainos išaugo 70 % ir paveikė žemės ūkio produktyvumą tokiose šalyse kaip Bangladešas, Egiptas ir Indija. Į tai reaguodamos, šalys pergrupavo prekybos partnerystes, Egiptas padidino kviečių importą iš Indijos ir Brazilijos, o Indonezija kreipėsi į Australiją ir Kiniją dėl trąšų, nors tai ir kelia didesnes išlaidas bei logistinius iššūkius. Konfliktas lėmė 20 % pasaulinių maisto kainų kilimą, o tai dar labiau pablogino maisto saugumo situaciją, ypač pažeidžiamuose regionuose. Tyrime pabrėžiama būtinybė diversifikuoti tiekimo šaltinius, stiprinti vidaus žemės ūkio gamybą ir atsparias tiekimo grandines, siekiant sušvelninti geopolitinių konfliktų įtaką pasaulinei prekybai ir maisto saugumui.

Reikšminiai žodžiai: pasaulinė prekyba, Ukrainos karas, trąšų ir kviečių rinkos nepastovumas, žemės ūkio eksportas, maisto saugumo įtaka.