

# EFFECTS OF THE UKRAINIAN CONFLICT: ANALYSIS OF ITS IMPACT ON THE AGRICULTURAL SECTOR OF SERBIA

ЕФЕКТИ КОНФЛИКТА У УКРАЈИНИ: АНАЛИЗА УТИЦАЈА НА  
АГРАРНИ СЕКТОР СРБИЈЕ

**Tatjana Brankov<sup>1</sup>**

Department of Agrarian and Agribusiness, Faculty of Economics in  
Subotica, University of Novi Sad, Republic of Serbia

**Anton Puškarić<sup>2</sup>**

Institute of Agricultural Economics, Belgrade, Republic of Serbia

**Abstract:** *Just like the rest of the world, Serbia also encountered numerous challenges in the agricultural sector due to the conflict in Ukraine. These challenges encompass disruptions in trade routes, shifts in import and export patterns, price fluctuations, heightened competition, and new market opportunities. This paper sheds light on the significant impact of the Ukrainian conflict on Serbian grain and apple exports. Moreover, it underscores the repercussions of Serbia's substantial reliance on fertilizer imports from Russia and provides recommendations to tackle this concern. In conclusion, the conflict prompts the necessity of policy adjustments in Serbia to effectively navigate the evolving trade dynamics. The armed conflict underscores the urgency of revising trade agreements and support mechanisms within the agricultural sector, ensuring the stability of agricultural trade.*

**Keywords:** *agricultural trade, conflict in Ukraine, Serbia.*

**Сажетак:** *Србија се, као и остатак света, суочила са бројним изазовима у сектору пољопривреде због сукоба у Украјини. Ови изазови обухватају поремећаје у трговачким путевима, промене у обрасцима увоза и извоза, флукуације цена, појачану конкуренцију и нове тржишне прилике. Овај рад осветљава значајан утицај украјинског сукоба на српски извоз житарица и јабука. Штавише, он наглашава последице значајног ослањања Србије на увоз ђубрива из Русије и даје препоруке за решавање овог проблема. У закључку, сукоб подстиче неопходност прилагођавања политике у Србији како би се ефикасно управљало динамиком трговине која се развија. Оружани сукоб наглашава хитност ревизије трговинских споразума и механизма подршке у оквиру пољопривредног сектора, осигуравајући стабилност трговине пољопривредним производима.*

**Кључне речи:** *пољопривредна трговина, конфликт у Украјини, Србија.*

**JEL classification:** *O13, O17, F13.*

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<sup>1</sup> tatjana.brankov@ef.uns.ac.rs

<sup>2</sup> anton.puskaric@gmail.com

## INTRODUCTION

The ongoing conflict in Ukraine holds the capacity to generate substantial supply disruptions, which could reverberate across global agricultural markets with profound implications. However, according to the World Trade Organization (WTO), global food supplies are much more stable than expected at the beginning of the war in Ukraine, meaning that the most pessimistic scenario have been avoided (WTO, 2023). Trade flows stayed open, trade of war-affected goods exhibited noteworthy resilience, and commodity prices saw milder increases than anticipated.

As outlined in its most recent July 2023 report, the International Monetary Fund (IMF) envisions a tapering of real GDP growth from the approximated 3.5 percent in 2022 to a 3.0 percent projection for both 2023 and 2024. In parallel, global headline inflation is expected to reduce from 8.7 percent in 2022 to 6.8 percent in 2023, further declining to 5.2 percent in 2024 (IMF, 2023). Nations reliant on imports swiftly secured alternative sources for critical commodities such as wheat, maize, sunflower products, fuels, and palladium (WTO, 2023a). As an illustration, Ethiopia expanded its procurement of wheat to encompass nations beyond Russia and Ukraine, including the United States and Argentina. While the onset of the Ukrainian conflict led to notable price hikes for commodities in the initial year, spanning from 4.4% (palladium) to 24.2% (maize), the actual escalation remained below projections. To illustrate, even in the direst WTO scenario, it was anticipated that wheat prices could surge by up to 85% in select low-income regions, yet the realized increase was 17% (WTO, 2023a).

The IMF's outlook on Russia's economy took a paradoxical turn. In January 2023, the IMF adjusted its projection for the Russian GDP, indicating an anticipated growth of 0.3%, as opposed to a previous decline estimate of 2.3%. However, the scenario shifted in March 2023, when predictions emerged stating that the impactful Western sanctions imposed on Moscow would wield devastating consequences on its economy, causing a contraction of at least 7%. The information presently available indicates that Russia's overall exports witnessed a notable uptick of 15.6% during the corresponding periods of March to November in both 2021 and 2022, involving the same set of reporting importers (WTO, 2023a).

Despite the steadfast performance of global trade to date, the ongoing conflict has brought forth many adverse consequences, spanning economic growth, stock markets, commodity markets, and food security (Steinbach, 2023). Especially precarious is the situation for less affluent regions heavily reliant on imports; the potential for escalated food instability looms larger in the medium term across the Global South (Glauben et al., 2022).

After the onset of the conflict in Ukraine, the Republic of Serbia finds itself in intricate geopolitical terrain. Amidst this, upholding the tenets of military neutrality stands paramount, alongside enhancing its strategic deterrent capabilities (Gajić, 2023). Furthermore, there is a need to elegantly tailor its policies to align with evolving trade dynamics, ensuring not only stability but also resilience in agricultural trade.

Within this context, this paper aims to analyze Serbia's agricultural trade with nations affected by an ongoing conflict. Additionally, it seeks to identify and address the significant challenges that this conflict poses to the Serbian agricultural sector. The primary objective is to understand how the conflict in Ukraine has disrupted global agricultural markets and trade, thereby affecting Serbia's agricultural sector through shifts in demand, price fluctuations, and alterations in trade patterns.

The hypothesis posits that the conflict in Ukraine has significantly disrupted global agricultural markets and trade dynamics, consequently impacting Serbia's agricultural sector through changes in demand, prices, and trade patterns. The additional hypothesis, termed the Supply Chain Vulnerability Hypothesis, suggests that the conflict in Ukraine has exposed vulnerabilities in Serbia's agricultural supply chains. This is particularly evident in terms of access to critical inputs (e.g., fertilizers) and export routes, thereby affecting production and trade within the agricultural sector.

## **1. THE INFLUENCE OF RUSSIA AND UKRAINE ON THE GLOBAL AGRICULTURAL MARKET**

The year 2018, preceding the onset of the COVID-19 pandemic and the outbreak of conflict, stands as an apt illustration of the significance of the nations entangled in the ongoing dispute within the realm of the agricultural market. As can be seen from *Table 1*, the agricultural products and commodities exported by both Russia and Ukraine significantly influence global supply and demand dynamics. In 2018, Russia was the largest global exporter of wheat as well as nitrogenous and compound fertilizers (NK and NPK). Undoubtedly, it plays a significant role in supplying the world with sunflowers, rapeseed, barley, corn, as well as potassic and phosphorus fertilizers. Ukraine was the largest global exporter of sunflower and an important player in the market of wheat, corn, barley and rapeseed.

Russia and Ukraine collectively contributed approximately 31.6% to the overall global wheat export volume, with Russia accounting for 23.03% and Ukraine for 8.6% (FAOSTAT, 2023). In 2018, the primary importers of Russian wheat were Egypt, Turkey, Vietnam, Sudan, Nigeria, Bangladesh, Indonesia, Yemen, and Latvia. The top 10 importers of

Ukrainian wheat included Indonesia, the Philippines, Egypt, Morocco, Tunisia, the Republic of Korea, Bangladesh, Spain, and Libya.

**Table 1. Global Export Rankings of Selected Products for Russia and Ukraine**

|                                | Product code | Russia | Ukraine |
|--------------------------------|--------------|--------|---------|
| <b>Wheat</b>                   | 100190       | 1      | 6       |
| <b>Corn</b>                    | 100590       | 7      | 4       |
| <b>Barley</b>                  | 100300       | 4      | 5       |
| <b>Sunflower</b>               | 151211       | 2      | 1       |
| <b>Rapeseed</b>                | 151410       | 3      | 8       |
| <b>Nitrogenous fertilizers</b> | 310230       | 1      | /       |
| <b>Fertilizers N and K</b>     | 310551       | 1      | /       |
| <b>Potassic fertilizers</b>    | 310420       | 3      | /       |
| <b>Phosphorus fertilizers</b>  | 310530       | 3      | /       |
| <b>NPK fertilizer</b>          | 310520       | 1      | /       |

Source: Authors' composition based on World Bank (WITS) data available at: <https://wits.worldbank.org/trade/country-byhs6product.aspx?lang=en>.

Around 18.8% of Russia's wheat and 15% of Ukraine's wheat found its way to the least developed countries (LDCs). Additionally, 46.2% of Russian wheat and 36.3% of Ukrainian wheat were directed to the African market. Notably, LDCs and Africa collectively sourced over half of their wheat imports from Russia and Ukraine. Specifically, LDCs relied on them for 53.4% of their wheat imports, with 37.2% from Russia and 16.3% from Ukraine. Africa depended on these countries for 51.4% of its wheat imports, with 37.9% coming from Russia and 13.5% from Ukraine. The significant role of Russia in the fertilizer market can be illustrated by several facts – it participated with 41.7% in the total world export of ammonium nitrate, 31.9% in NPK fertilizers, 14.1% in urea, 10.1% in phosphate rock, etc. (FAOSTAT, 2023).

The ongoing conflict has generated significant tensions in the global market, yet no physical shortages are anticipated in terms of worldwide wheat supply (Glauben et al., 2022). Following the initial disruption of grain and oilseed exports via sea routes, the Black Sea Grain Initiative and Solidarity Lanes' establishment came into effect. Despite experiencing a substantial reduction in comparison to the preceding year (for instance, a 69% decrease in barley exports, a 19% decrease in corn exports, and a 47% decrease in wheat exports during July-December 2022 compared to the same period in the previous year), Ukraine has successfully revitalized its capability to export noteworthy commodities through the ports of Odesa, Chernomorskoy and Pivdennyi, all thanks to these initiatives (USDA, 2023).

According to the USDA estimate in 2022/23, Russia had record production of wheat, sunflower seed, and rapeseed (USDA, 2023a). Projections indicate that Russian wheat exports are poised to achieve an unprecedented milestone of 45.0 million tons in the 2022/23 period, marking a notable 36% surge from the preceding year and surpassing its previous record set in 2017/18 by 3.5 million tons. This substantial figure significantly overshadows the subsequent top exporter, as EU wheat exports stand at 35.0 million tons. Also, it is expected that Russian fertilizer exports in Q2-Q4 2023 would return to the level of the same period in 2021 (Interfax, 2023).

Nonetheless, the situation remains dire for poor regions reliant on imports. In these areas, the likelihood of persistent or potentially exacerbated local supply deficits is heightened due to the possible further price escalation. According to some estimates conflict itself pushed 117 million people into extreme deprivation last year (UN, 2023a). Alternative assessments are less pronounced and allocate blame for heightened hunger to several factors, encompassing the pandemic, recurring weather disruptions, and disparate conflicts, including the ongoing situation in Ukraine (WHO, 2023).

However, the Black Sea endeavor was not extended after its third tenure ended on July 17, 2023 (UN, 2023). Renewed uncertainties related to exportable supplies led to significant increases in wheat and vegetable oil prices (FAO (Food and Agriculture Organization), 2023). Thus, forecasting market trends for the upcoming marketing year and beyond remains a challenge, allowing for conjecture at best. The primary elusive factor pertains to the duration of the conflict and the uncertainties surrounding the timing and way a resolution may eventually materialize. The degree of integration of these two nations into global agricultural commodity markets in the future will also wield a considerable influence. Equally crucial will be their determination (or capacity) to facilitate seamless market operations, stabilize international prices during periods of high volatility, and enhance worldwide food security (Glauben et al., 2022).

## **2. SERBIA'S AGRICULTURAL TRADE WITH RUSSIA AND UKRAINE**

When considering trade value, Russia emerges as a highly significant market for Serbian agricultural products. However, the same cannot be affirmed for Ukraine. In 2018, the Russian Federation accounted for 10.5% of the total value of Serbia's agricultural exports, while Ukraine contributed merely 0.2%. As for imports, Russia constituted a 3.9% share in import value, whereas Ukraine contributed only 0.5% (FAOSTAT,

2023). Serbia's most valuable products exported to Russia were apples, cheese made from whole cow milk, peaches and nectarines, fruit prepared n.e.c., and strawberries. The most valuable product exported to Ukraine was sunflower seeds, accounting for 56% of the total export value. The most valuable agricultural products imported from Russia were tobacco, cigarettes, crude sunflower-seed oil, food wastes, and margarine. From Ukraine, the most valuable agricultural imports included other oil seeds not elsewhere classified, food preparations of flour, meal, or malt extract, and fruit preparations not elsewhere classified.

Given the aforementioned factors, Serbia has legitimate cause for concern concerning the export of fruits and fruit-derived products in the context of crop and livestock product exports. To illustrate, the share of the Russian market in the total apple exports from Serbia, expressed in quantities, decreased from 85.9% in 2018 to 66.6% in 2022 (WITS, 2023). In a span of just one year, the value of domestic apple exports to Russia experienced a decrease of over 20 million USD, declining from 94.1 million in 2021 to 72.7 million in 2022. At the beginning of the crisis, the following issues were recorded: transportation delays, seeking alternative transit routes, and delays or the inability to collect receivables. Now, different issues have arisen – uncertainty about the collection of overdue receivables as well as an increase in transportation costs. Transportation goes through either Lithuania and Latvia or through Poland and Belarus. The route is approximately 400 kilometers longer compared to the previous route that went through Ukraine. There are more border crossings, all of which extend the journey by 2 to 3 days. All these factors are mirrored in the export price of apples and, consequently, in the quantities sent to Russia. The reasons for the decreased export of Serbian apples to Russia should also be sought beyond the wartime circumstances, specifically in Russia's domestic policies that emphasize food self-sufficiency. To illustrate, Russia has been gradually reducing the quantities of imported apples year after year, from 843,463 tons in 2018 to 615,999 tons in 2021 (WITS, 2023). In the same time Russia has increased its own domestic production from 1,859,400 tons to 2,216,200 tons (FAOSTAT, 2023). In other words, in the period 2018-2021 Russia decreased the quantities of apple imported for 227,464 tons while increased the quantities of apple produced for 356,800 tons. According to the latest data the level of Russia's self-sufficiency in apples is close to 100% (Götz et al., 2022).

To overcome these challenges, during 2022, Serbia obtained permits for exporting apples to Egypt and Indonesia. However, for shipments to commence towards these new markets, alignment of phytosanitary conditions and tariff removal are necessary. Finding new export markets is not the only solution to the problem. Equally important

is also the reduction of production costs, the implementation of mechanized pruning, and the concentration of supply through collaboration and association, along with increasing domestic apple consumption.

In Serbia's imports from Russia, fertilizers hold greater significance than agricultural products. Although Serbia serves as the primary supplier upon which the food security of the entire western Balkan region heavily relies (Brankov, 2022), the country is highly dependent on fertilizer imports, acquiring approximately 70% of its needs from external sources. Following the insolvency of Azotara Pančevo, Elixir Group remains as the sole domestic producer of mineral fertilizers. The market lacks robust competition, given that Elixir Group, the predominant fertilizer manufacturer, was also the top importer in 2017 and 2018, succeeded by PROMIST in 2019.

Among all Western Balkan countries, Serbia exhibits the highest degree of reliance on fertilizers imported from Russia (Brankov, 2023). As evident from *Table 2*, Serbia meets 75.9% of its NPK requirements through imports from Russia. The degree of dependence is similarly substantial for ammonium nitrate, urea, and potassic fertilizers, standing at 57%, 30.2%, and 27.5%, respectively.

**Table 2. Percentage Share of Russian and Ukrainian Fertilizer Imports in Serbia, 2018**

|                             | Product code | Russia | Ukraine |
|-----------------------------|--------------|--------|---------|
| <b>Urea</b>                 | 310210       | 30.2   | /       |
| <b>NPK</b>                  | 310520       | 75.9   | /       |
| <b>Ammonium nitrate</b>     | 310230       | 57.0   | /       |
| <b>Potassic fertilizers</b> | 310420       | 27.5   | 64.8    |

Source: Authors' composition based on World Bank (WITS) data available at: <https://wits.worldbank.org/trade/country-byhs6product.aspx?lang=en>.

Consequently, a noticeable upward trend in fertilizer prices is evident. During the second quarter of 2022, input prices for agriculture saw a year-on-year increase of 34.3% (and a quarter-on-quarter increase of 9.7%). The substantial rise was attributed to the significant 177% year-on-year increase in the cost of mineral fertilizers. Year-on-year price increases were observed for seeds (31.9%), pesticides (26.2%), and animal feed (22.0%) as well (BFC, 2022).

The data presented in *Table 3* represents the price indices for mineral fertilizers across different quarters from 2020 to 2023. In the first quarter of 2020, the price index stood at 106.6, indicating a slight increase in mineral fertilizer prices compared to the same period in the previous

year. However, by the fourth quarter of 2020, the index had decreased to 94.3, signaling a dip in prices as the year progressed. The first quarter of 2021 maintained the same price index of 94.3, suggesting price stability. A significant uptick was observed in the fourth quarter of 2021, with the index soaring to 144.2. This substantial increase marked a noteworthy shift in the pricing trend, attributed to a combination of factors such as supply-demand dynamics, market speculation, and global economic conditions. The data for the first quarter of 2023 mirrors the preceding quarter, maintaining an index of 209.2.

**Table 3. Price indices for mineral fertilizers January to current quarter (same period last year = 100), Serbia**

|       | 2020/IV | 2021/I | 2021/IV | 2022/I | 2022/IV | 2023/I | 2023/IV |
|-------|---------|--------|---------|--------|---------|--------|---------|
| 106.6 | 94.3    | 94.3   | 144.2   | 144.2  | 209.2   | 209.2  | /       |

Source: Authors' composition based on the Statistical Office of the Republic of Serbia data available at: <https://data.stat.gov.rs/Home/Result/03020201?languageCode=sr-Cyrl>

High fertilizer and diesel prices (*Table 4*) affected crop production during 2022, which will be discussed in the subsequent text.

**Table 4. Prices of fertilizers and diesel (in Din and US\$)**

| Commodity         | March-2021     |                 | March-2022     |                 | March-2023     |                 |
|-------------------|----------------|-----------------|----------------|-----------------|----------------|-----------------|
|                   | Din/MT         | USD/MT          | Din/MT         | USD/MT          | Din/MT         | USD/MT          |
| <b>Fertilizer</b> | 47,000         | 427             | 90,000         | 820             | 80,000         | 727             |
| <b>Urea</b>       | 49,000         | 445             | 97,000         | 880             | 65,000         | 590             |
| <b>Diesel</b>     | 148<br>din/lit | 1.35<br>USD/lit | 198<br>din/lit | 1.80<br>USD/lit | 179<br>din/lit | 1.63<br>USD/lit |

Source: USDA (2023b)

### 3. THE IMPACT OF THE UKRAINIAN CONFLICT ON SERBIAN GRAIN EXPORTS

The conflict in Ukraine has impacted Serbia's grain exports. Immediately after the start of the conflict (24 February 2022) in Ukraine, Serbia imposed a Decision on the temporary prohibition of the export of essential basic agricultural food products vital for the population (Official Gazette No 32/2022), which included wheat, wheat flour, rye, corn, cornmeal, and sunflower oil. Subsequently, on April 20, the Government of Serbia chose to rescind the ban on exporting wheat, corn, flour, and refined sunflower oil. Instead, monthly export quotas were implemented, which were eventually removed on July 21, 2022. The measures have led to



discontent among Serbian farmers, millers, oilseed associations, exporters, and organization companies. The decision to revoke the export ban on wheat and corn was taken after assessing the present circumstances and the stock of wheat post-harvest. Additionally, approval was granted for the export of 4,000 tons of bulk refined sunflower oil (MPŠV, 2022).

An extreme drought experienced by Serbia from May through the summer of 2022, characterized by exceptionally dry weather and elevated temperatures, has further exacerbated the issues. The average corn yields in 2022 amounted to 4.5 tons per hectare of cultivated land, which is a quarter less than in 2021 (STIPS, 2021). Total production of corn decreased by 28.9% from 6,027,131 tons in 2021 to 4,283,293 tons in 2022 (RZS, 2023). The wheat crop has also been affected by adverse conditions. Despite a 5.4% increase in the planted area, reduced fertilizer uses and insufficient precipitation during the critical growth period led to a decreased wheat crop compared to 2021/22. The yield decreased by 14%, from 5.7 t/ha in 2021 to 4.9 t/ha in 2022, resulting in total production declining from 3,442,308 to 3,109,827 tons (9.7%) (RZS, 2023).

Nevertheless, despite the production decrease, Serbia, as in previous years, was able to satisfy domestic needs in wheat and corn. However, the drop in exports was significant compared to earlier estimates, primarily since 80% of Serbia's grain exports rely on Black Sea ports for international trade (USDA, 2023b).

Serbia export of meslin and wheat other than durum (code 100190) decreased by 28.3 % from 1,036,280 tons in 2021 to 743,597 tons in 2022. Export levels were diminished by a combination of factors, including a five-month export ban, export quotas, and hindered river transportation caused by historically low water levels in the Danube River. Another logistical challenge arises from our primary grain export route being river transportation, with all our shipments flowing through these river corridors to Constanta. This situation is compounded by a substantial volume of Ukrainian goods also converging in Constanta, resulting in congested silos. This scenario adds complexity as the lack of storage space for barge-transported goods becomes an extra hurdle to navigate. The combination of inadequate export levels and full silos presents a new challenge in 2023: where will the wheat be stored? Currently, domestic wheat struggles to compete with the prices of Ukrainian and Russian wheat. Additionally, producers are facing difficulties in covering production costs.

Challenges in the grain trade organization in Serbia involve deteriorated railway infrastructure, low weight capacity and speed, with half of the railway tracks enabling speeds exceeding 60 km (about 37.28 mi)/h. Additionally, there is a scarcity of outdated and inefficient vessels, limitations in the infrastructure of downstream internal waterways, and a

restricted count of intermodal grain terminals. Under usual circumstances, a huge portion of Serbia's corn intended for export traveled via the Danube River to the Port of Constanza in Romania. However, due to the Russia-Ukraine war that occurred from October 2022 to March 2023, merely around 70,000 metric tons of corn were exported through the Danube River. This situation compelled much of the corn to be transported by trucks to destinations such as Bosnia and Herzegovina, Albania, Italy, Kosovo, Montenegro, and Croatia. This reversal of typical transportation routes is atypical for an average year (USDA, 2023b). As a result, the corn export has been halved. In the marketing year 2021/22 Serbia exported 1,5 million tons of corn or 1,5 million tons less than in 2021/22 (MPŠV, 2023).

Russia's withdrawal from the grain agreement will cause a renewed accumulation of Ukrainian grain. Ukraine will seek alternative routes, and there is a risk that Constanta will become so filled with goods that Serbia will have no place to market its wheat and corn. If such a situation persists, Serbia will have to seek alternative mostly neighboring markets for its corn.

## **CONCLUSION**

The ongoing conflict in Ukraine triggered a massive shock to the global economy. Many problems arose in the food and energy markets, including price spikes, logistic barriers, supply chain disruptions, jeopardizing food security, and the growth of poverty, among other issues. All the countries of the world are directly or indirectly affected by this conflict. Serbia, as an active player in the international agricultural arena, has also encountered numerous challenges stemming from this conflict.

Bilateral relations between the Republic of Serbia and the Russian Federation have been successfully developed in all areas. Russia plays a crucial role as a trading partner for Serbia, particularly in the fruit and fertilizer sectors. There is also mutual interest and potential for the development of economic cooperation with Ukraine, although to a lesser extent. Ukraine's production assortments overlap with Serbia's traditional export products, leading to a smaller trade exchange, especially in primary agricultural products.

The decreased apple exports to Russia serve as a notable example that emphasizes the necessity of aligning the Serbian agricultural sector with the market, enhancing flexibility in finding new partners, and undertaking a comprehensive transformation of the food system. Serbia's heavy reliance on fertilizer imports from Russia is giving rise to worries regarding diminishing economic access to food. Consequently, the most viable and lasting solution would involve revitalizing the domestic fertilizer industry. Another viable approach is undeniably to persist in ongoing endeavors to broaden the array of fertilizer suppliers. Thirdly, it

holds paramount significance for the government to provide adequate support to farmers (such as fuel and fertilizer subsidies). Equally vital is the enhancement of fertilizer utilization efficiency and a thorough reevaluation of our energy policy.

This work has certain limitations. Certain factors, such as the influence of implemented agricultural measures on poorer export performance, have not been included in the analysis. Therefore, future research could focus on conducting a more detailed analysis of these factors. Furthermore, additional research is required to assess the contribution of the Open Balkans initiative to Serbia's agricultural exports during these challenging years.

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