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Oksana Kiforenko*

0000-0001-8838-0068

GEO-POLITICS AND GEO-ECONOMICS OF UKRAINE AND THE CIS: AGRO – FOOD PRODUCTS TRADE ISSUES

ABSTRACT:

The turbulences in the global geo-political relations impact the geo-economical ones as well and vice versa. The interrelations of the mentioned issues influence the said relations on the supra-national, continental, national and regional levels. The sphere of agricultural and food products trade is extremely vibrant to such fluctuations as imports of agri – food products help fulfil the lack of food or its shortage, giving consumers access to the products of bigger variety and better quality at lower prices. The following methods of scientific research were used, while conducting the research: empirical, comparative and statistical analyses, including data mining, cleaning and processing, methods of correlation measuring like Pearson, Spearman and Kendal correlation tests, the method of exclusion, as well as textual and tabular methods as well as the ones for data visualization, etc. Together with the changes in the political relations, the economic and trade ones for the analyzed subjects changed as well, redirecting the Ukrainian agricultural products imports from the Russian Federation and Belarus to the Central Asian and Caucasian countries. The research results

* Institute of Agricultural and Food Economics – National Research Institute (Poland), e-mail: oksana.kiforenko@ierigz.waw.pl

showed that the agricultural products imports to Ukraine from the following countries pairs appeared to be correlated: Armenia with Belarus, Georgia, Moldova and Uzbekistan; Azerbaijan with Georgia and Uzbekistan; Belarus with Georgia and Tajikistan; Georgia with Tajikistan and Uzbekistan; Kyrgyz Republic with the Russian Federation. The research and its results would be of interest for the public administration officials, dealing either with agricultural production or trade, small farmers and big agro holdings managers, small and big agro traders, politicians and decision makers, academic society representatives as well as statisticians and data analysts.

Keywords: *agro – food products, international trade, Ukraine, correlation, Commonwealth of Independent States, geo-politics, geo-economics*

1. INTRODUCTION

Every next announcement of this or that politician makes the global geo-political set of order shiver, threatening political or economic relations, established and functioning for years. Independent of their strength, the mentioned announcements caused shifts in the geo-political relations, whether immediate or hypothetical ones. All of that pulls a series of meetings, talks, consultations aimed at making the right decisions along with extensive research to develop projections and scenarios for the next changes, while ensuring the uninterrupted functioning of the political scene. But the mentioned announcements are not the most demanding thing for the successful functioning of any system. Rather such unannounced deeds as, for example, a war are the most shocking circumstances, which need to be immediately reacted on. As a result, in such a globalized world every change in geo-politics implies the eventual changes in geo-economics as. Of course, in the world, where all the activity spheres are so connected and interrelated, all the branches are important, but there is the one no creature can survive without. And that is agriculture, with the related industries/spheres/branches, as agriculture is the primary source of employment, income, and food in many countries (NICHE, n.d.). Ukraine enjoys excellent conditions for agriculture, including around a third of the world's most fertile land (ThinkTank, 2024). It is added by favorable climatic and agro-meteorological conditions, sufficient amount of water resources and sun irradiation, availability of skilled relatively cheap workforce and good long historic practices of doing agriculture. All the factors mentioned above, plus the country’s location on the European crossroads, make it one of the top global agricultural producers and exporters.

On the other hand, despite all the conditions and factors favoring the agricultural production in Ukraine, it cannot be self-sufficient in all the agricultural products and must import the lacking ones. More than that, much of the country's land was made unsuitable for agriculture due to the ongoing war, with approximately 20-25% of the territory (according to different sources) being invaded by the aggressor and another undefined part - polluted, mined or under mines threat. Therefore, the agricultural production declined after the war started, making the people in charge search for another ways to ensure food security for the country's population, with imports being the most obvioussolution.

Imports of agricultural products is a key driver to decrease food insecurity. They are especially important for agro- and food-constrained countries, dependent on the incoming commodities mentioned above. Thanks to imports, consumers of one country have access to the agro goods and food, which are impossible or too costly to be produced in their homeland. In addition, consumers can increase their life quality getting access to the new, cheaper or products of better quality, not mentioning their wider variety. But, first and foremost, the need to supply a country's population with the sufficient amount of food is the main driving force behind the country's decision to import agro and food products. For instance, the top five global exporters are the EU, the United States, Brazil, China, and Canada, while the top five global importers of agricultural goods are China, the United States, the European Union (EU), the United Kingdom (U.K.), and Japan (USDA, 2024). So, we see that either a large population or scarcity of land resources force the countries to be big agro and food importers. That is why agricultural products imports have become - and remain - an important issue for research and discussion as imports help fulfil food lack or shortage, giving consumers access to the agricultural and food products of a bigger variety, better quality or lower prices.

2. LITERATURE REVIEW

The theoretical background for the presented research can be considered the interrelation of geopolitical and geo-economic theories. Geopolitics, which was firstly coined by Rudolf Kjellén, is the analysis of the geographic influences on power relationships in international relations, being currently used as a synonym for international politics (Deudney, 2025). Among the developed geopolitical theories, the most applicable here is the classical geopolitics, which emphasizes the influence of physical geography on state power and behaviour, focusing on such concepts as heartland, rimland, and sea power (Fiveable, n.d.). One of the most renowned researchers in the field of classical geopolitical analysis is H. J. Mackinder, who advanced several significant concepts, such as manpower, social momentum, geostrategic "points of view" and the "heartland (Mackinder Forum, 2023). Within the recent research works on different aspects of geopolitics, the

ones by McGee, Edmiston and Haward (2024)., Mizan (2024), Topalidis, Kartalis, Velentzas and Sidiropoulou (2024), Nickel (2024), (Sashalmi (2024), Cope (Ed.). (2024), but not abridged to, are worth to be paid attention at. At the same time, geo-economics is referred to as the application of power politics by economic means and, sometimes, is used as a description of a contest waged via global trade and investment World Economic Forum, 2025). As any scientific notion, there are different definitions and explanations of it, e.g. some researchers agree to define geoeconomics as a systemic framework for understanding how economics, technology, and geography affect the international system as a whole, going beyond a study of individual states themselves (Lee, 2024). The most recently published research works on geo-economics comprise, among the others, the ones authored by Tumanyan, Koryttsev and Ipatova (2025), (Kumar and Singh (Eds.) (2025), Mohr and Trebesch (2025), Hązła (2025), Morales, Andréosso-O'Callaghan and Rajmil (Eds.) (2025), and others.

Looking through the literature sources on the topic under research, it was noticed, that there are a lot of publications dedicated to the agricultural products exports from Ukraine, among which one should mention: I. Kholoshyn with his co-authors researching the structure and geography of agricultural exports from Ukraine, revealing its potential and the level of self-sufficiency (Kholoshyn, 2021), N. Parkhomenko and her co-authors researched the agricultural sector both of the world and Ukraine, identifying the areas to assess the country's export potential (Parkhomenko et al., 2022), L. Buiak and her colleagues examined the impact of the crisis events in Ukraine on its agricultural products exports to the EU countries and the world (Buiak et al., 2023), S. Tkalenko with colleagues made an attempt to identify either endogenous or exogenous factors that determine the scale and dynamics of Ukraine's exports of organic agricultural food products (Tkalenko, Melnyk & Kudyrko, 2021), M. Bezpartochnyi with his co-authors analysed the dynamics and structure of Ukraine's agricultural exports in 2021 and during martial war, identifying the main problems faced by agricultural enterprises during martial law (Bezpartochnyi, Britchenko & Bezpartochna, 2022), O. Totska made an attempt to forecast the exports value of the Ukrainian agricultural products based on fuzzy sets (Totska, 2022), T. Melnyk with her colleagues tried to identify the factors for the formation and implementation of the export potential of Ukraine's agro-industrial complex, evaluating and defining its place on world food markets (Melnyk, Tunitska & Liubyma, 2021), N. Gafarov and his co-authors analysed the grain production and export capacity of Ukraine in 2010 – 2021, identifying the major factors, that have recently affected the country's macroeconomic indicators and determined their potential for the decline (Gafarov, Ibrahimov & Huseynov, 2022), M. Carriquiry with his co-authors created scenarios of reduced exports and production affecting both Ukraine and Russia that increase maize and wheat prices by up to 4.6% and 7.2%, respectively

(Carriquiry, Dumortier & Elobeid, 2022), Y. Danko and O. Krasnorutskyy worked on the identification of the features and indicators for the effective realization of the export potential of the Ukrainian grain market in the view of the state's food security (Danko & Krasnorutsky, 2022), A. Rose and his colleagues analysed the economic impacts of grain ex-port disruptions, caused by the Russia–Ukraine War, during the first year of hostilities, using the Global Trade Analysis Project (GTAP) computable general equilibrium model (Rose, Chen & Wei, 2023), S. Nadvynychnyy and Z. Pushkar studied the competitive advantages of agriculture and their sources as well as singled out the problems of export of agricultural products under the conditions of the formation of the export strategy in the transformation of the agricultural sector of Ukraine (Nadvynychnyy & Pushkar, 2021), S. Koliadenko with a group of co-authors studied the state, perspective directions of Ukrainian exports of agricultural products and the introduction of effective forecasting using the method of mathematical modelling of a continuous system of aperiodic components (Koliadenko et al., 2020), K. Vasylkovska with her colleagues analyzed the production and yield of sunflower seeds in Ukraine for the period from 2000 to 2019, carrying out the comparative analysis of the gross harvest of sunflower seeds and the export of sunflower oil for the years under research (Vasylkovska et al., 2021), V. Chemerys with a group of his colleagues studied and substantiated the export potential of the livestock industry of Ukraine based on available resources, taking into account the productivity of fodder crops and farm animals (Chemerys et al., 2020), and others.

However, when an attempt was made to find scientific publications on the topics connected with the agricultural products imports of Ukraine, it appeared to be a problem. as The matter is that Ukraine is much spoken about as one of the biggest global agro producers and exporters. Terefore,the country's agro imports is described rather briefly and mostly for comparison with the exports or in the context of the total agricultural products trade. So, the scientific gap, identified above as a result of the literature sources search, will be perfectly filled in with the research and its results presented in the given article. Hence, the goal of the research is to assess the geo-economic and the geopolitical changes in the relations between Ukraine and the countries of the Euro-Asian region through the assessment of the shifts in the economic and political relations between the members (full or partial) of one of the biggest country unions of the world - the CIS. Within the research course, the scientific question of whether political events connected with Ukraine influenced its agro imports amounts from the CIS member states has been indicated, stating the hypothesis that they did. The aim mentioned above was reached through the analysis of the agricultural products imports to Ukraine from the analyzed CIS member states during the period of 2001 to 2023, making stress on their state of matters and changes in 2001, 2010, 2015, 2021, 2022, and 2023. In addition the assessment

of the changes of the said imports in the first and second war years, if compared to the year with the first available data, the last pre-war and the first war years was made. Also, the calculation of the correlation coefficients between the agricultural products imports to Ukraine from the analyzed CIS member states was conducted.

3. MATERIAL AND METHODS

Selecting the right methodology for one's research is a critical decision that can significantly impact the quality and relevance of the said work, determining how the analyzed data are collected, analyzed, and interpreted, ultimately guiding the impact one's research can have (Jones, 2023). Such methods of scientific research as empirical, comparative and statistical analyses, including data mining, cleaning and processing, methods of correlation measuring like Pearson, Spearman and Kendal correlation tests, the method of exclusion, as well as textual and tabular methods for better data presentation and comparison were used for the research conduction. As a measure of the strength of the association between two continuous variables (Kenton, 2024) the Pearson correlation coefficient (r) was calculated with the help of R statistical software, which, in turn, was made according to the formula presented below (Srivastav Ashish Kumar & Dheeraj Vaidya, 2024):

$$r = \frac{n(\sum xy) - (\sum x)(\sum y)}{\sqrt{[n\sum x^2 - (\sum x)^2][n\sum y^2 - (\sum y)^2]}} \quad (1),$$

where: r – Pearson correlation coefficient, n – number of the stock pairs.
Due to a relatively small number of observations and the possible non-normality of their distribution, added by the willingness to make the presented research results the most robust possible, the Spearman correlation coefficient test has been implemented. Itmeasures any monotonic relationship between two continuous random variables and is adopted when the data do not follow a normal distribution (Rovetta, 2020). A simpler formula for the Spearman rank correlation coefficient calculation is presented below (Cheusheva, 2022):

$$\rho = 1 - \frac{6\sum d_i^2}{n(n^2-1)} \quad (2),$$

where: ρ – Spearman rank correlation coefficient, di – difference between a pair of ranks, n – number of observations.

Due to the reasons mentioned above, besides Pearson and Spearman, Kendall rank correlation non-parametric test was conducted according to the following formula (Finnstats, 2021):

$$\tau = \frac{number\ of\ concordant\ pars - number\ of\ disconcordant\ pairs}{n\,(n-1)/2} \quad (3),$$

where: τ – Kendall's rank correlation coefficient, n – number of observations.

In order to double-check the research results and assess their statistical significance , the *p*-values, corresponding to the Pearson, Spearman and Kendall coefficients, were calculated and presented in the tabular form.

The data analyzed in the article are the values of gross agricultural products imports to Ukraine from eleven Commonwealth of Independent States (CIS) member states, expressed in thousands of USD. The data were taken from the World Integrated Trade Solution (WITS) Commodity Trade (Comtrade) database (WITS-Comtrade, 2024). The time frame under analysis is 23 years, that is from 2001 to 2023 included. In order to ensure the highest robustness of the research results and thanks to the fact, that all the data were in the same format, as well as to the absence of missing values, the data didn't need to be manipulated. The lists of agricultural products, imported by Ukraine either from the world in general or eleven CIS member states in particular, were presented in a tabular form., They were composed according to the Harmonized System (HS) 4-digits codes, that are commonly used throughout the import and export processes for the classification of goods. The Harmonized System is a standardized numerical method of classifying traded products (International Trade Administration, n.d.). The product descriptions in the tables presented in the paper were given in the abbreviated format for place saving and better data visibility purposes. In order to give readers a detailed picture of the imported products, the products codes were given in the tables as well. The calculations of the correlation coefficients and their corresponding *p*-values as well as the creation of correlograms were made with the help of the R statistical software (R Core Team, 2022).

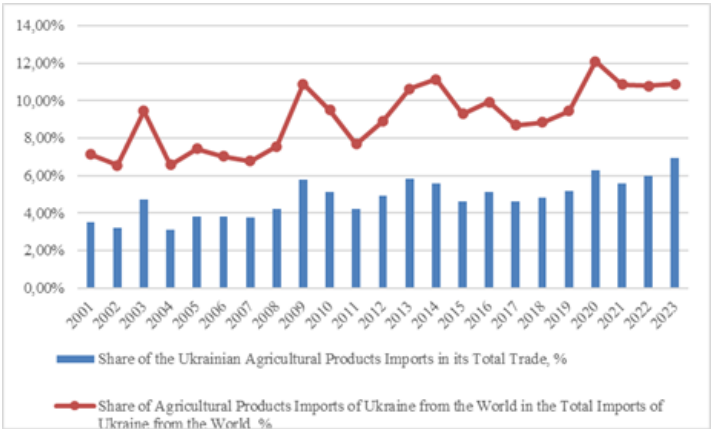
4. RESULTS AND DISCUSSION

International trade - whether exports or imports - is not just an economic tool but also a political one, used either for the establishment or termination of the relations between countries. The information of who trades with whom can tell us a lot both about the geo-economical and geopolitical situation in the given world part. Let's take, for example, the Commonwealth of Independent Staes

(CIS) – a free association of sovereign states. It origieds on December 8, 1991, when the elected leaders of Russia, Ukraine, and Belarus signed an agreement forming a new association to replace the crumbling Union of Soviet Socialist Republics (U.S.S.R.) (Britannica, 2024). The CIS contain Armenia, Azerbaijan, Belarus, Kazakhstan, Kyrgyzstan, Moldova, Russia, Tajikistan, and Uzbekistan as official members, while Georgia, Turkmenistan, and Ukraine are not (the membership agreements were not ratified by their parliaments), and Moldova has reduced participation in the union in recent years (Statista, 2024). The Commonwealth of Independent States brought together countries with different traditions, languages and religions but some of them still have rather close economic and political ties (Matchplat, n.d.).The main directions of collaboration between the CIS member states in the economic and social fields were announced to be the formation of the common free market zone on the basis of market relations and free traffic of commodities, services, capitals and labour force, as well as the assistance to the development of the common information zone (McDavid, 2008). But the trends inside the CIS gradually started to change in 2000s. It was partially because some of the CIS member-states were pulled by another integration project, namely the EU, as Georgia, Ukraine and Moldova actively work on implementing the European integration (Makhanov, n.d.). Nevertheless, the economic - and more precisely trade - relations between the member states were intensified thanks to the conclusion of a regional free trade agreement in 1994 by eleven CIS countries, This was further reinforced by the emergence of some 30 bilateral free trade agreements between the CIS countries in the course of the 1990s with an attempt to create a customs union afterwards (Mayes & Korhonen, n.d.). Despite the differences in the chosen political and economic course chosen for their development, trade relations between the CIS member states are functioning nowadays, with more or less success, reflecting the changes in their political relations.

Ukraine, not being a full member of the CIS, is one of the world's biggest agricultural producer and exporter. The country benefits from favourable climatic and natural conditions for certain types of agricultural production. However, no country in the world, can be self-sufficient in all the agricultural production kinds because of the global climate differences. So, even such an important agricultural producer as Ukraine imports some agricultural and food products, from the CIS member states as well. Though the said imports may take a relatively small share of a country's trade turnover, it doesn't make it less important either for the insurance of food security or for the successful functioning of a country as a whole. The shares of the Ukrainian agricultural products import in its total trade and total imports are depicted with the help of a combined graph in Figure 1.

Figure 1
Share of the Ukrainian Agricultural Products Imports in its Total Trade and Total Imports, %



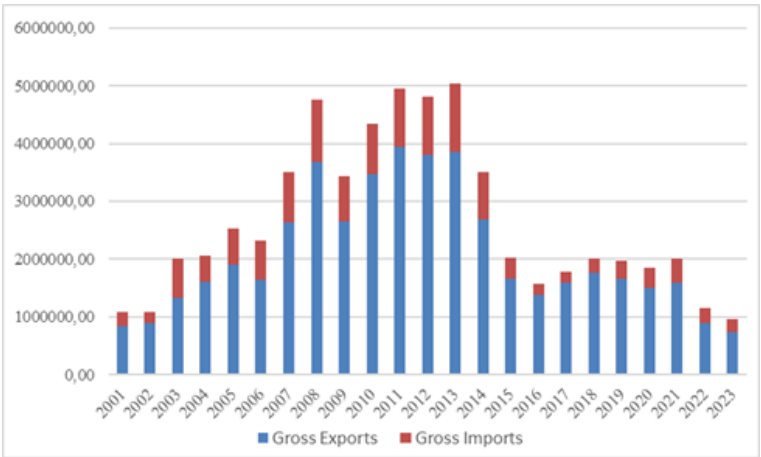
Note: author's elaboration on the basis of the data from (WITS-Comtrade, 2024).

Analyzing the share of the Ukrainian agricultural products imports in its total trade, it can be stated, that, though fluctuating through the researched time period, its general tendency is upward as its value in 2023 is almost twice as high as in 2001. In addition, in the years 2003, 2009, 2013, 2020 and 2023 the increase for the agro imports shares in the total trade of Ukraine can be noticed. It should also be stated that the biggest share mentioned above can be observed in 2023, while the smallest one – in 2004. Though the shape of the graph for the share of the Ukrainian agricultural products imports in its total imports seem to be rather similar to that of the share for the Ukrainian agricultural products imports in its total trade, there are still differences between them. Among the said differences, one should mention, that the increase peaks for the share of the Ukrainian agricultural products imports in its total imports can be observed in the years 2003, 2009, 2014 and 2020. Among the similar things between the two mentioned graphs, the changeability and the overall upward tendency can be noticed. At the same time, the difference for the share of the Ukrainian agricultural products imports in its total imports in 2001 is approximately 1.5 times smaller than that of 2023. In addition the biggest value for the share of the Ukrainian agricultural imports in its total imports can be seen in 2020, while the smallest one – in 2002. The changes for the analyzed shares in the first and second war years differ also. That is – we observe the increase for the share of the Ukrainian agricultural products imports in its total trade either in 2022 or 2023, but the decrease for the share of the agricultural products imports of Ukraine in its total imports in 2022 with its next increase in 2023. Before

assessing the agricultural imports of Ukraine from the CIS member states, the dynamics of the country's agricultural products trade with the said countries union, subdivided into its exports and imports, is presented in the figure given below.

Figure 2

Agricultural Products Trade of Ukraine with 11 CIS Member States, thsd USD

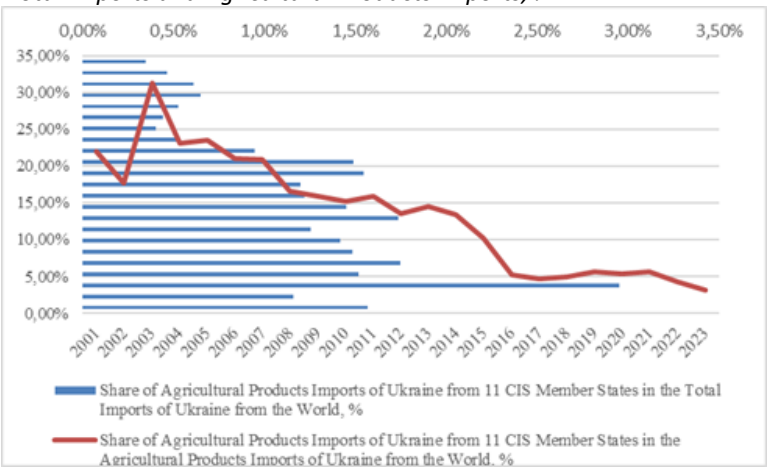


Note: author's elaboration on the basis of the data from (WITS-Comtrade, 2024).

The dynamics for the agricultural trade of Ukraine with the CIS member states mirrors the changes in the political relations of the country with the analysed union, that is - three time periods of the trade increase – 2001 – 2022, 2003 – 2005, and 2008. The decrease of the mentioned trade value in the following 2009 may be explained by the world financial crisis impact. The next four years were notified with the unstableness of the analysed dynamics, just like the relations of Ukraine with some of the CIS member states. The decrease for the agricultural products trade of Ukraine with the said countries, that last three time periods after 2013, can be explained by the consequences of the war actions implemented by the Russian Federation towards the country under research. Afterwards another changeable time period concerning the agro trade dynamics could be observed from 2017 to 2021 included. In the following two years the next decrease of the mentioned trade can be observed due to the impact of another war actions towards Ukraine. To further develop the research, let's assess the share of the Ukrainian agricultural products imports from the analysed 11 CIS member states in its total imports and agricultural products imports, visualized in Figure 3.

Figure 3

Share of the Ukrainian Agricultural Products Imports from 11 CIS Member States in its Total Imports and Agricultural Products Imports, %



Note: author's elaboration on the basis of the data from (WITS-Comtrade, 2024).

Analyzing the share of the agricultural products imports of Ukraine from 11 CIS member states in the total imports of the country, we observe the shares' increase in the years 2003, 2005, 2009, 2013 and 2018 – 2020. The rest of the time periods experienced the said shares decrease. Comparing the mentioned results with the changes in the share of agricultural products imports of Ukraine from 11 CIS member states in the agricultural products imports of the country, we can see some similarities between the two shares differences values. They increased in the years 2003, 2005, 2013, 2018 and 2019 and decreased in the years 2002, 2004, 2006-2008, 2010, 2012, 2014-2017, 2022 and 2023. The changes in the analyzed shares during the rest of the years don't coincide between each other. It should also benoted - though itis often assumed - , that the changes in the imports or exports shares don't automatically mean the changes in their absolute amount or value.

Although Ukraine is one of the most important agricultural producer and exporter globally, it still has to import some agro products because of the reasons mentioned above. In order to make the presented research the fullest possible, the lists of 10 agricultural products mostly imported by Ukraine from all of its trade partners were composed according to their imports' values. These lists were compiled for the years 2001, 2021, 2022 and 2023 to show the changes in the agro products imported by Ukraine before and during some of the most significant events in the country's history (Table 1).

Table 1

Lists of 10 Agricultural Products mostly Imported by Ukraine (according to their Import Values)

	2001		2021		2022		2023	
№	**Product Code**	**Product Description**	**Product Code**	**Product Description**	**Product Code**	**Product Description**	**Product Code**	**Product Description**
1	1701	Cane or beet sugar…	0303	Fish, frozen..	2309	Preparations used in animal feeding	2309	Preparations used in animal feeding
2	2401	Unmanufactured tobacco…	2106	Food preparations…	0303	Fish, frozen…	0303	Fish, frozen…
3	0303	Fish, frozen…	2309	Preparations used in animal feeding	0805	Citrus fruit…	2208	Undenatured ethyl alcohol…
4	0207	Poultry meat …	2403	Other manufactured tobacco…	1206	Sunflower seeds…	2403	Other manufactured tobacco…
5	1801	Cocoa beans…	2208	Undenatured ethyl alcohol …	2106	Food preparations…	2106	Food preparations…
6	2106	Food preparations…	1511	Palm oil and its fractions…	0901	Coffee…	0805	Citrus fruit…
7	0902	Tea…	0805	Citrus fruit…	2208	Undenatured ethyl alcohol…	1206	Sunflower seeds…
8	1511	Palm oil…	0406	Cheese and curd.	0406	Cheese and curd.	0901	Coffee…
9	0805	Citrus fruit…	1206	Sunflower seeds…	2403	Other manufactured tobacco…	0803	Bananas, fresh or dried
10	2101	Extracts, essences and concentrates	0302	Fish, fresh or chilled…	1511	Palm oil and its fractions…	0406	Cheese and curd.

Note: author's elaboration on the basis of the data from (WITS-Comtrade, 2024).

Comparing the products codes and descriptions in the lists from 2001 and 2021, presented in the table given above, we see that four items appear in both lists, though in different positions. These are (according to the HS Classification 1996) 0303 (Fish, frozen, excluding fish fillets and other fish meat of heading 0304), 2106 (Food preparations not elsewhere specified or included), 1511 (Palm oil and its fractions, whether or not refined, but not chemically modified) and 0805 (Citrus fruit, fresh or dried) with the rest of the products being different. If we compare the lists of 10 agricultural products mostly imported by Ukraine as of 2021 and 2022, or the pre-war year and the first war year, the results appeared to be completely different. The mentioned list differ by one single item only – 0302 (Fish, fresh or chilled, excluding fish fillets and other fish meat of heading 0304) imported in 2021 and 0901 (Coffee, whether or not roasted or decaffeinated; coffee husks and skins; coffee substitutes containing coffee in any proportion) – in 2022. The rest of the agricultural products are similar but took

different positions. The comparison for the lists of the agro products mostly imported by Ukraine in 2022 and 2023 - the first and second war years - reveals a pattern similar to the previous analysis: the lists of the top agro products imported into Ukraine differ from each other by one item as well – 1511 (Palm oil and its fractions, whether or not refined, but not chemically modified) in 2022 and 0803 (Bananas and plantains, fresh or dried) in 2023. After comparing the products lists presented in Table 1 for 2021 and 2023 - the pre-war year and the second year of thewar - we can state, that the difference is about two items, meaning - 1511 (Palm oil and its fractions, whether or not refined, but not chemically modified) and 0302 (Fish, fresh or chilled, excluding fish fillets and other fish meat of heading 0304) present in the 2021 year list, while 0901 (Coffee, whether or not roasted or decaffeinated; coffee husks and skins; coffee substitutes containing coffee in any proportion) and 0803 (Bananas and plantains, fresh or dried) – in 2023. So, we see, that the war has affected the values of the agricultural products imported by Ukraine. However, some scientist may note, that it's not a single factor but rather a combination of factors that has influenced the agro imports picture of Ukraine. It can't be denied , of course, yetit should be noticed, that the war is the most influential of all these factors.

The next step of the research is the overall, statistical, correlation and comparative analyses of the country's agricultural imports from the CIS member states. Their results are given below, started with the basic statistics of the imports values during the years of 2001 to 2023 included. The basic statistics all by themselves can't be considered the indicators representable enough to base one's statistical analysis on them alone, but a good starting point for any analysis type. The basic statistics for the agricultural products imports values of Ukraine from the analyzed CIS member states are presented in Table 2.

Table 2

Basic Statistics for the Agricultural Products Imports Values of Ukraine from the Analyzed CIS Member States.

	Min.	1st Qu.	Median	Mean	3rd Qu.	Max.
Armenia	3153.0	5511.0	10008.0	9629.0	12659.0	19161.0
Azerbaijan	2828.0	7463.0	11475.0	14081.0	19081.0	33873.0
Belarus	0.0	26024.0	47378.0	56953.0	95896.0	121334.0
Georgia	8771.0	42421.0	74821.0	68457.0	91376.0	134221.0
Kazakhstan	2342.0	8581.0	17267.0	29547.0	23053.0	232032.0
Kyrgyz Republic	150.3	893.8	1138.4	1693.7	2130.0	5569.8
Moldova	20309.0	23509	31988.0	37284.0	49734.0	75869.0

Russian Federation	149.8	45173.6	286623.1	337578.3	598158.2	835576.8
Tajikistan	10.6	259.2	819.7	942.2	1210.7	2684.6
Turkmenistan	0.0	34.0	87.4	108.5	139.7	674.4
Uzbekistan	2841.0	7942.0	11987.0	11832.0	14494.0	23606.0

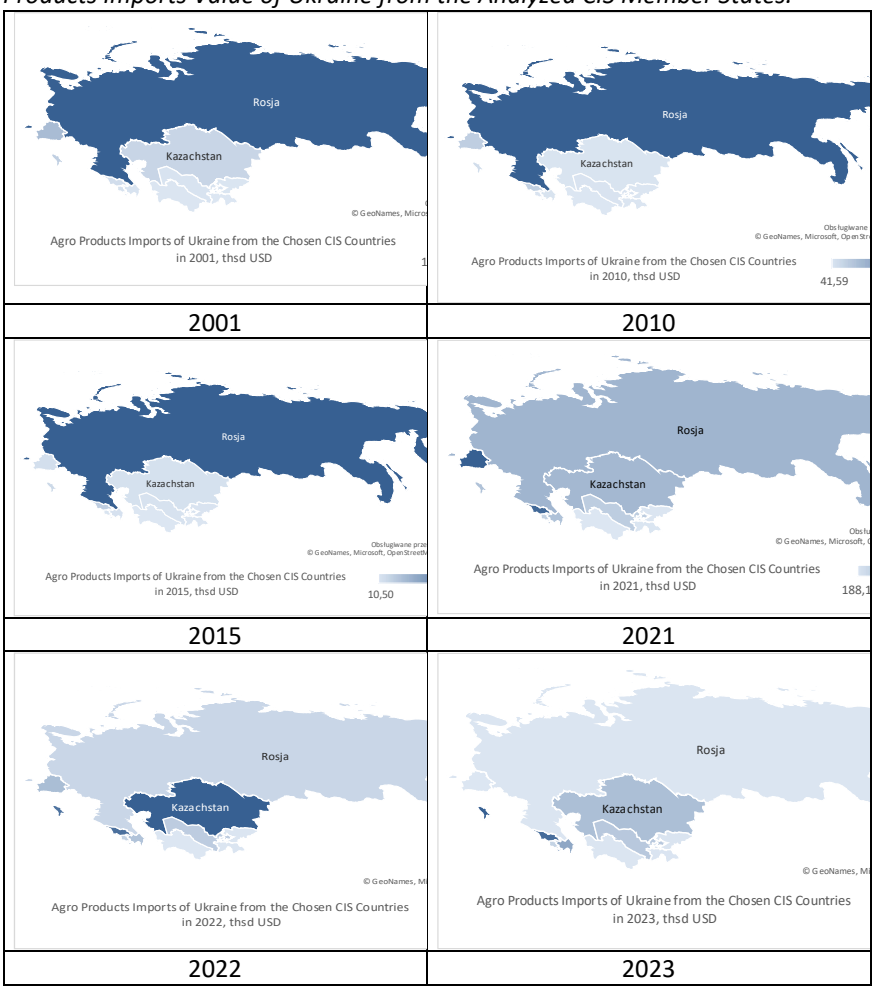
Note: author's elaboration made with the help of (R Core Team, 2022) on the basis of the data from (WITS-Comtrade, 2024).

While analyzing the data presented in the table given above, it should first be noted, that "Min." refers to the minimum value, "max." – maximum value, "1st Qu." – the first Quartile, and "3rd Qu." – the third Quartile. After reviewing the data in the table above, it should be noted, that the list of the analyzed countries, made in the ascending order according to their agricultural products exports to Ukraine , would look like as follows: Belarus, Turkmenistan, Tajikistan, Russian Federation, Kyrgyz Republic, Kazakhstan, Azerbaijan, Uzbekistan, Armenia, Georgia, and Moldova. The list of the analyzed countries, made in ascending order by their maximum agro exports to Ukraine values (), would be as follows: Turkmenistan, Tajikistan, Kyrgyz Republic, Armenia, Uzbekistan, Azerbaijan, Moldova, Belarus, Georgia, Kazakhstan, and Russian Federation. So, we see, that two out of three countrieswith the smallest agro exports into Ukraine values in both lists coincide, and these are Turkmenistan, Tajikistan. It should be noted, that Turkmenistan takes the last place in the list of the countries according to their statistical data availability and transparency. That's why the so-called mirror data are to be considered the raw ones. If talking about the countries with the biggest agro exports to Ukraine values, only one country, meaning Georgia, is present among the top three ones in both lists. Turning to the statistical indicators of our analysis, it should be stated, that the datasets most closely resembling a normal distribution, are those for Ukraine's agricultural products imports from (in the ascending order) Turkmenistan, Tajikistan, and Armenia, judging by their mean and medium values. Analyzing the spread of the data sets under research, the mostly spread out of them (in the descending order) are the ones of the Russian Federation, Kazakhstan, and Georgia. If talking about such a measure of variability as the interquartile range (IQR), the countries, having 50% of their agro exports to Ukraine values mostly spread out, (in the descending order) are Russian Federation, Belarus, and Georgia. The war itself along with its direct and indirect consequences – such as changes in the political and economic relations with the countries supporting the aggressor and, consequently, the necessity to search for new partners and alternative logistic routes - added a lot to the data changeability, and, thereby, influenced the statistical analysis results. To better assess how Ukraine's agricultural products imports from the CIS countries changed, the imports values were visualized as maps for the CIS

country members under research across the years 2001, 2010, 2015, 2021, 2022 and 2023 (Figure 4).

Figure 4

Products Imports Value of Ukraine from the Analyzed CIS Member States.



Note: author's elaboration on the basis of the data from (WITS-Comtrade, 2024).

Judging by the colour shades, representing Ukraine's agricultural imports from the countries mentioned above, we notice, that the biggest imports value in 2001 came from the Russian Federation, followed by Belarus, Moldova, Kazakhstan, Armenia, Georgia, Azerbaijan, Turkmenistan, Uzbekistan, Kyrgyz Republic, and Tajikistan (in the descending order). The list of the CIS member states, made

according to their agricultural products exports to Ukraine values in 2010, would look in the following way: the Russian Federation, Belarus, Kazakhstan, Georgia, Moldova, Azerbaijan, Armenia, Turkmenistan, Uzbekistan, Kyrgyz Republic, and Tajikistan. As we see, the countries, taking the first two positions in terms of their agro products to Ukraine, remained the same, as did the four countries exporting the least agro products to, based on their values. The first changes among Ukraine's biggest agricultural products exporters can be seen in 2015, when Belarus took the first place, replacing the Russian Federation and pushing it to the second place. All other countries maintained their 2010 places, except for Kyrgyz Republic and Uzbekistan, which exchanged their places, if compared to those of 2010. The explanation of the places change mentioned above, seems to be obvious, pointing to the impact of the 2013 – 2014 political events on the decrease of the Ukrainian agro products imports from the Russian Federation. The 2021 list of the countries, made according to the same criterion as before, showed that all the countries changed their places compared to 2015, except for Kyrgyz Republic and Tajikistan. The mentioned list looks like (in the descending order): Belarus, Moldova, Georgia, Azerbaijan, Kazakhstan, Armenia, Uzbekistan, Russian Federation, Kyrgyz Republic, Turkmenistan, and Tajikistan. The year 2022 denoted the further importance of Moldova and Georgia for the Ukrainian agricultural products imports as the said countries moved to the first and second places in terms of the imports to Ukraine values, respectively. Kazakhstan took back the third place, just like in 2015. The list of three countries, which are least important for the Ukrainian agro products imports, changed as well with the Russian Federation took the last place for the first time during the analysed time frame. Therefore, the 2022 list of the CIS member states, made according to their agro products exports to Ukraine (in the descending order) looks like: Moldova, Georgia, Kazakhstan, Azerbaijan, Belarus, Armenia, Uzbekistan, Kyrgyz Republic, Turkmenistan, Tajikistan, and Russian Federation. Such a countries' placement has, among the others, purely political reasons, related to the war and its consequences, including the interruptions of the Black Sea Corridor functioning. These interruptions made Ukraine search for another logistics routes either for its exports or imports. Though the overall values for the agro products imports of Ukraine from Moldova and Georgia decreased in 2023, they still took the first two places in terms of their agro exports to Ukraine. On the contrary, the said value of Kazakhstan increased in 2023, but not that much to move the country from the third place it took. In 2023 Belarus joined the Russian Federation, taking the last two places in the mentioned list, which looks like the following way (in the descending order): Moldova, Georgia, Kazakhstan, Azerbaijan, Armenia, Uzbekistan, Kyrgyz Republic, Turkmenistan, Tajikistan, Belarus, and Russian Federation. To assess changes of Ukraine's agricultural products imports from the CIS member states in the first and second war years, the differences were

calculated and tabularized in order to facilitate clearer and more visualized data comparison (Table 3).

Table 3

Differences for the Agro Products Imports Values of Ukraine from the Analyzed CIS Member States, thsd USD.

Partner Name	2022 to 2001		2022 to 2021		2023 to 2001		2023 to 2021		2023 to 2022	
	thsd USD	%	thsd USD	%	thsd USD	%	thsd USD	%	thsd USD	%
Armenia	5 078.57	▲100.2	-9 014.46	▼47.0	5 244.59	▲103.5	-8 848.45	▼46.2	166.02	▲1.6
Azerbaijan	14 927.33	▲527.8	-14 900.44	▼45.6	31 045.22	▲1097.8	1 217.45	▲3.7	16 117.89	▲90.8
Belarus	-23 388.66	▼53.5	-100 973.24	▼83.2	-43 749.62	▼100.0	-121 334.21	▼100.0	-20 360.96	▼100.0
Georgia	50 881.23	▲580.1	-52 994.06	▼47.0	56 533.06	▲644.5	-47 342.23	▼42.0	5 651.83	▲9.5
Kazakhstan	50 818.12	▲294.3	27 091.09	▲66.1	3 805.11	▲22.0	-19 921.92	▼48.6	-47 013.01	▼69.1
Kyrgyz Republic	-895.77	▼85.6	-262.85	▼63.6	-174.38	▼16.7	458.54	▲111.0	721.39	▲479.9
Moldova	35 277.71	▲150.1	26 786.53	▲83.7	49 253.10	▲209.6	40 761.93	▲127.4	13 975.39	▲23.8
Russian Federation	-134 664.98	▼94.6	-36 434.93	▼82.4	-142 273.56	▼99.9	-44 043.51	▼99.7	-7 608.58	▼98.1
Tajikistan	225.48	▲2137.3	-734.19	▼75.7	745.31	▲7064.5	-214.37	▼22.1	519.82	▲220.2
Turkmenistan	-44.35	▼34.8	-105.19	▼55.9	-97.80	▼76.8	-158.64	▼84.3	-53.45	▼64.4
Uzbekistan	9 958.75	▲350.6	-9 804.88	▼43.4	12 964.45	▲456.4	-6 799.18	▼30.1	3 005.70	▲23.5

Note: author's elaboration on the basis of the data from (WITS-Comtrade, 2024).

The analysis of the data presented in the table given above reveals the similarity inthe changes ofthe agro imports of Ukraine from the analyzed CIS member states during the first and the second war years compared to those of 2001. The changes can be divided into two groups, according to their positiveness or negativeness. The first one contains Armenia, Azerbaijan, Georgia, Kazakhstan, Moldova, Tajikistan and Uzbekistan, whose agro exports to Ukraine increased both during the first and the second war years. The rest of the analyzed CIS member states are in the second group, denoting the decrease in the said exports during the mentioned time period. The changes for the agro products imports of Ukraine from the said countries in the first war year, if compared to the pre-war year, can also be divided into two groups according to the same criterion. Although the groups filling will be different. The first group, containing the CIS member states with the increased agro exports to Ukraine, will be filled in with Kazakhstan and Moldova only. All the rest CIS member states will "go" to the second group, containing those, whose agro exports to Ukraine decreased, if compared to those of 2021. When we examine the changes in Ukraine's agro imports from the definite CIS member states in the second war year compared to the pre-war year the group of the countries denoting their exports increase

contains Azerbaijan, Kyrgyz Republic and Moldova. The rest of the researched countries denoted their exports decrease. If we compare the values for the agro products exports from the analyzed CIS member states to Ukraine in the second war year to those of the first one, we'll see, that the group of the countries, which increased their exports, contains Armenia, Azerbaijan, Georgia, Kyrgyz Republic, Moldova, Tajikistan and Uzbekistan. The rest four countries denoted their exports decrease. The difference between the analyzed changes in 2023, if compared to 2001 and 2022, are only two countries - Kazakhstan and Kyrgyz Republic. By Kazakhstan we observe the increase in the country's agro products exports to Ukraine in 2023, if compared to those of 2001, but - decrease, if compared to those of 2022. And the situation with Kyrgyz Republic is vice versa to that of Kazakhstan.

To expand the research, the lists of 10 agricultural products most frequently imported by Ukraine from 11 analyzed CIS member states, were composed based on their imports value and are presented in the table given below to increase the data presentation and facilitate comparison analysis (Table 4).

Table 4

Lists of 10 Agricultural Products mostly Imported by Ukraine from 11 CIS Member States (according to their Import Values)

	2001		2021		2022		2023	
№	**Product Code**	**Product Description**	**Product Code**	**Product Description**	**Product Code**	**Product Description**	**Product Code**	**Product Description**
1	1701	Cane or beet sugar…	2208	Undenatured ethyl alcohol…	2208	Undenatured ethyl alcohol…	2208	Undenatured ethyl alcohol…
2	1001	Wheat and meslin.	2204	Wine of fresh grapes…	2402	Cigars, cheroots, cigarillos…	2204	Wine of fresh grapes…
3	2403	Other manufactured tobacco…	2201	Waters…	1104	Cereal grains…	0810	Other fruit, fresh.
4	1101	Wheat or meslin flour.	0810	Other fruit, fresh.	2204	Wine of fresh grapes…	2201	Waters…
5	2204	Wine of fresh grapes…	1104	Cereal grains…	2201	Waters…	0703	Onions, shallots, garlic, leeks…
6	0303	Fish, frozen…	1604	Prepared or preserved fish; caviar	0810	Other fruit, fresh.	0806	Grapes, fresh or dried.
7	1806	Chocolate…	1008	Buckwheat, millet & canary seed…	0806	Grapes, fresh or dried.	1206	Sunflower seeds…

8	0403	Buttermilk, curdled milk and cream,	2403	Other manufactured tobacco…	0709	Other vegetables, fresh or chilled.	0807	Melons…
9	2402	Cigars, cheroots, cigarillos….	0402	Milk and cream…	1008	Buckwheat, millet and canary seed;	0709	Other vegetables…
10	2309	Preparations used in animal feeding	1806	Chocolate…	0703	Onions, shallots, garlic, leeks…	0813	Fruit, dried…

Note: author's elaboration on the basis of the data from (WITS-Comtrade, 2024).

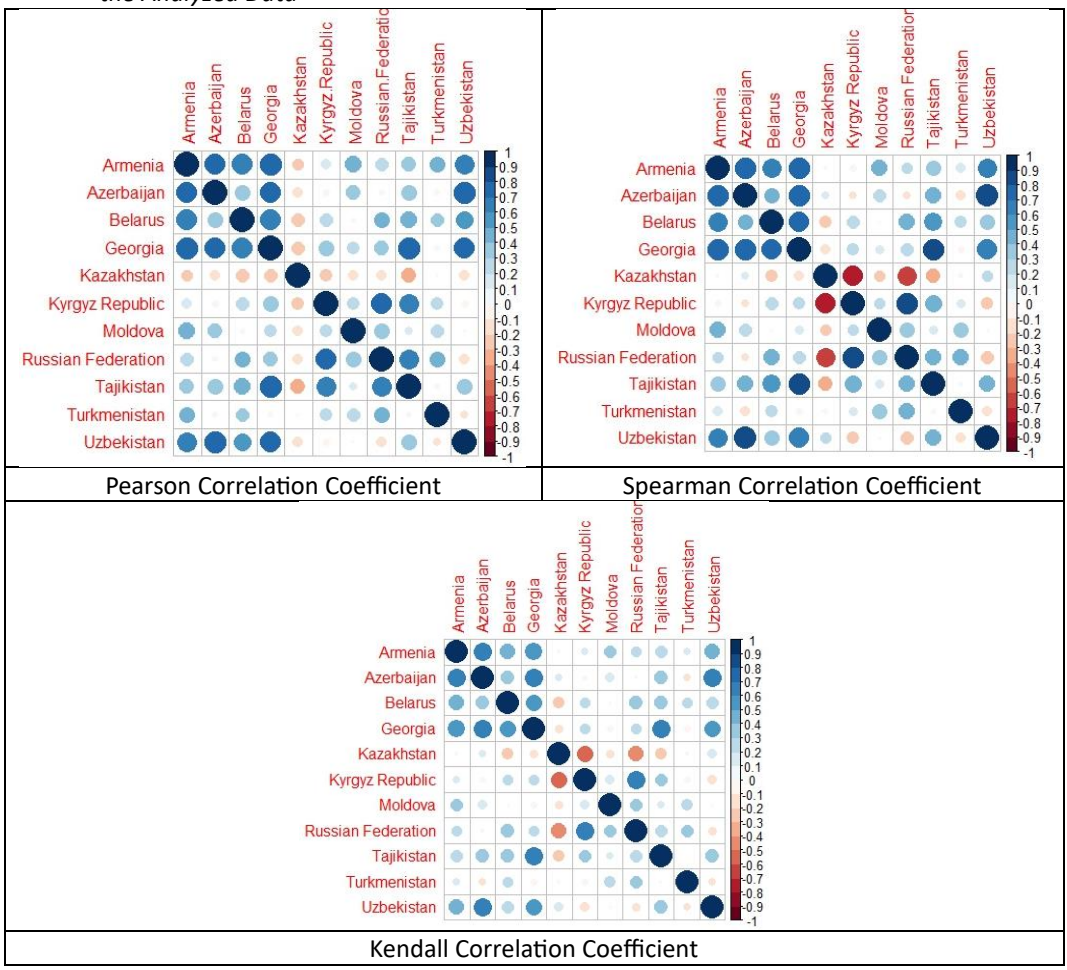
Reviewing the list of the agro products presented in the table given above, it can be stated, that, unlike the lists of 10 agricultural products most frequently imported by Ukraine from the global market, only three similar products appear in the lists of 10 agricultural products imported by Ukraine from 11 CIS member states in both 2001 and 2021. These are 24 03 (Other manufactured tobacco and manufactured tobacco substitutes; "homogenized" or "reconstituted" tobacco; tobacco extracts and essences), 2204 (Wine of fresh grapes, including fortified wines; grape must other than that of heading 2009) and 1806 (Chocolate and other food preparations containing cocoa). The rest of the products are different, pointing to the changed imports preferences of Ukraine in the mentioned years. While comparing the said products lists from the pre-war year and the first war year, it should be noted that they differ by four items. The ones, that are present in 2021, but absent in 2022, are 1604 (Prepared or preserved fish; caviar and caviar substitutes prepared from fish eggs), 2403 (Other manufactured tobacco and manufactured tobacco substitutes; "homogenized" or "reconstituted" tobacco; tobacco extracts and essences), 0402 (Milk and cream, concentrated or containing added sugar or other sweetening matter) and 1806 (Chocolate and other food preparations containing cocoa). On the other side, the products, that appear on the said list in the year 2022, are those of the codes 2402 (Cigars, cheroots, cigarillos and cigarettes, of tobacco or of tobacco substitutes), 0806 (Grapes, fresh or dried), 0709 (Other vegetables, fresh or chilled) and 0703 (Onions, shallots, garlic, leeks and other alliaceous vegetables, fresh or chilled). After the comparison analysis, conducted over the mentioned lists of products as of the first and the second war years, it can be noted that they differ by three items. The agricultural products, which can be found in 2022, but cannot in 2023, contain 2402 (Cigars, cheroots, cigarillos and cigarettes, of tobacco or of tobacco substitutes), 1104 (Cereal grains otherwise worked (for example, hulled, rolled, flaked, pearled, sliced or kibbled), except rice of heading 1006; germ of cereals, whole, rolled, flaked or ground) and 1008 (Buckwheat, millet and canary seeds; other cereals (including wild rice)). On the other hand, the products, having appeared in the said list in 2023, without being present in 2022, contain the ones with the codes 1206 (Sunflower seeds, whether or not broken), 0807 (Melons

(including watermelons) and papayas (papaws), fresh) and 0813 (Fruit, dried, other than that of headings 0801 to 0806; mixtures of nuts or dried fruits of this chapter). At the same time, the comparison of the lists of the agricultural products imported by Ukraine from 11 CIS member states during the pre-war and the second war years shows that these lists differ by six items. The products being imported in 2021, but not in 2023, include 1104 (Cereal grains otherwise worked (for example, hulled, rolled, flaked, pearled, sliced or kibbled), except rice of heading 1006; germ of cereals, whole, rolled, flaked or ground), 1604 (Prepared or preserved fish; caviar and caviar substitutes prepared from fish eggs), 1008 (Buckwheat, millet and canary seeds; other cereals (including wild rice)), 2403 (Other manufactured tobacco and manufactured tobacco substitutes; "homogenized" or "recon-stituted" tobacco; tobacco extracts and essences), 0402 (Milk and cream, concentrated or containing added sugar or other sweetening matter) and 1806 (Chocolate and other food preparations containing cocoa). At the same time, the agro products, which were imported by Ukraine from 11 CIS member states in 2023, without being noticed in 2021, are the ones with the codes 0703 (Onions, shallots, garlic, leeks and other alliaceous vegetables, fresh or chilled), 0806 (Grapes, fresh or dried), 1206 (Sunflower seeds, whether or not broken), 0807 (Melons (including watermelons) and papayas (papaws), fresh), 0709 (Other vegetables, fresh or chilled), and 0813 (Fruit, dried, other than that of headings 0801 to 0806; mixtures of nuts or dried fruits of this chapter). That once more points to the change of Ukraine's agro imports preferences, caused, in the major sense, directly or indirectly by the war.

Considering the long term economic and political relations with the CIS member states, it would be interesting to assess whether Ukraine's agro products imports from these countries correlate with each other. The calculations results for the Pearson, Spearman and Kendall correlation tests are visualized with the help of correlograms given below (Figure 5).

Figure 5

Correlograms for the Pearson, Spearman and Kendall Correlation Coefficients of the Analyzed Data



Note: author's elaboration made with the help of (R Core Team, 2022) on the basis of the data from (WITS-Comtrade, 2024).

After a precise inspection of the correlograms presented above, one can conclude that, according to the Pearson correlation test results, the agricultural products exports to Ukraine from the following countries – pairs appeared to be correlated with the following degrees: strong positive – Armenia with Azerbaijan, Belarus, and Georgia; Azerbaijan with Georgia and Uzbekistan; Belarus with Georgia; Georgia with Tajikistan and Uzbekistan; Kyrgyz Republic with the Russian Federation and Tajikistan; the Russian Federation with Tajikistan;

moderate positive – Armenia with Moldova and Uzbekistan; Belarus with the Russian Federation, Tajikistan and Uzbekistan; Georgia with Turkmenistan; the Russian Federation with Turkmenistan; weak positive – Armenia with the Russian Federation, Tajikistan and Turkmenistan; Azerbaijan with Belarus, Moldova and Tajikistan; Belarus with Turkmenistan; Georgia with Kyrgyz Republic, Moldova, and the Russian Federation; Kyrgyz Republic with Moldova and Turkmenistan; Moldova with the Russian Federation and Turkmenistan; Tajikistan with Uzbekistan; weak negative – Armenia with Kazakhstan; Belarus with Kazakhstan and Kyrgyzstan; Georgia with Kazakhstan; Kazakhstan with Kyrgyzstan and Tajikistan.

The results of the Spearman correlation test, visualized in the second correlogram, allow us make the following conclusions: the agricultural products exports to Ukraine from the following countries – pairs appeared to be correlated with the following degrees: strong positive – Armenia with Azerbaijan, Belarus, Georgia and Uzbekistan; Azerbaijan with Georgia and Uzbekistan; Belarus with Georgia; Georgia with Tajikistan and Uzbekistan; Kyrgyz Republic with the Russian Federation; moderate positive – Armenia with Moldova and Tajikistan; Azerbaijan with Belarus and Tajikistan; Belarus with the Russian Federation, Tajikistan and Uzbekistan; Kyrgyz Republic with Tajikistan; Moldova with the Russian Federation and Turkmenistan; the Russian Federation with Tajikistan and Turkmenistan; Tajikistan with Uzbekistan; weak positive – Armenia with the Russian Federation; Azerbaijan with Moldova; Belarus with Kyrgyzstan and Turkmenistan; Georgia with Kyrgyzstan and the Russian Federation; Kazakhstan with Uzbekistan; Kyrgyz Republic with Moldova; strong negative - Kazakhstan with Kyrgyzstan and the Russian Federation; moderate negative - Kazakhstan with Tajikistan; weak negative - Belarus with Kazakhstan; Kazakhstan with Moldova; Kyrgyz Republic with Uzbekistan; the Russian Federation with Uzbekistan.

The results of the Kendall correlation test indicate the following countries pairs, whose agro exports to Ukraine appeared to be correlated: strong positive – Azerbaijan with Georgia and Uzbekistan; Georgia with Tajikistan; Kyrgyz Republic with the Russian Federation; moderate positive – Armenia with Azerbaijan, Belarus, Georgia and Uzbekistan; Belarus with Georgia; Georgia with Uzbekistan; weak positive – Armenia with Moldova, the Russian Federation, and Tajikistan; Azerbaijan with Belarus and Tajikistan; Belarus with Kyrgyzstan, the Russian Federation, Tajikistan, Turkmenistan and Uzbekistan; Georgia with Kyrgyzstan and the Russian Federation; Kyrgyz Republic with Tajikistan; Moldova with the Russian Federation and Turkmenistan; the Russian Federation with Tajikistan and Turkmenistan; Tajikistan with Turkmenistan; moderate negative – Kazakhstan with Kyrgyzstan, and the Russian Federation; weak negative – Belarus with Kazakhstan; Kazakhstan with Tajikistan. It should also be added that the correlated countries pairs were used without repetitions. In addition, the

coefficients - whether positive or negative - with the values smaller than 0.2 were not taken into consideration due to their insignificance.

To verify the statistical significance of the correlation tests mentioned above, the *p*-values corresponding to the correlation coefficients were calculated and presented in the tables given below. The *p*-values, corresponding to the Pearson correlation coefficients, are tabularized in Table 5.

The analysis of the *p*-values corresponding to the Pearson correlation test results indicates that the results for the following countries pairs are statistically significant: Armenia with Azerbaijan, Belarus, Georgia, Moldova and Uzbekistan; Azerbaijan with Georgia and Uzbekistan; Belarus with Georgia, Tajikistan and Uzbekistan; Georgia with Tajikistan and Uzbekistan; Kyrgyz Republic with the Russian Federation; the Russian Federation with Tajikistan. To omit the weaknesses of either the analyzed data themselves or the conducted correlation test, the *p*-values corresponding to the Spearman correlation coefficients were calculated and presented in the table given above (Table 6).

The *p*-values corresponding to the Spearman correlation coefficients indicate the following correlation test results to be statistically significant: Armenia with Azerbaijan, Belarus, Georgia, Moldova and Uzbekistan; Azerbaijan with Belarus, Georgia, Tajikistan and Uzbekistan; Belarus with Georgia, the Russian Federation and Tajikistan; Georgia with Tajikistan and Uzbekistan; Kazakhstan with Kyrgyz Republic and the Russian Federation; Kyrgyz Republic with the Russian Federation and Tajikistan; the Russian Federation with Tajikistan and Turkmenistan; Tajikistan with Uzbekistan. Another way to double-check the correlation tests results and ensure their robustness is the calculation of the *p*-values corresponding to the Kendall correlation coefficients, the results of which are presented in Table 7.

After a careful examination of the *p*-values calculation results for the Kendall correlation test, the following countries pairs provide evidence for being statistically significant: Armenia with Belarus, Georgia, Moldova and Uzbekistan; Azerbaijan with Belarus, Georgia, Tajikistan and Uzbekistan; Belarus with Georgia, the Russian Federation and Tajikistan; Georgia with Tajikistan and Uzbekistan; Kazakhstan with Kyrgyz Republic and the Russian Federation; Kyrgyz Republic with the Russian Federation and Tajikistan; Moldova with the Russian Federation; the Russian Federation with Turkmenistan; Tajikistan with Uzbekistan. The comparison analysis indicated that the agricultural products imports to Ukraine from the following countries pairs appeared to be correlated: Armenia with Belarus, Georgia, Moldova and Uzbekistan; Azerbaijan with Georgia and Uzbekistan; Belarus with Georgia and Tajikistan; Georgia with Tajikistan and Uzbekistan; Kyrgyz Republic with the Russian Federation.

Table 5

p-values for the Pearson Correlation Coefficients of the Analyzed Data

	Armenia	Azerbaijan	Belarus	Georgia	Kazakhstan	Kyrgyz. Republic	Moldova	Russian. Federation	Tajikistan	Turkmenistan	Uzbekistan
Armenia		9.316E-05	0.00028	4.9E-05	0.337442	0.46143	0.030552	0.18961	0.126158	0.04578	0.001209
Azerbaijan	9.3E-05		0.06706	0.00012	0.425132	0.71827	0.120484	0.79906	0.079144	0.7625	5.54E-06
Belarus	0.00028	0.0670554		0.00024	0.195634	0.17095	0.856502	0.0516	0.021332	0.15162	0.008461
Georgia	4.9E-05	0.0001219	0.00024		0.166267	0.06505	0.28421	0.08291	4.1E-05	0.794	0.000133
Kazakhstan	0.33744	0.4251322	0.19563	0.16627		0.21824	0.445125	0.43203	0.101461	0.99319	0.468515
Kyrgyz. Republic	0.46143	0.7182651	0.17095	0.06505	0.218243		0.238409	7.1E-05	0.00169	0.23888	0.693965
Moldova	0.03055	0.1204837	0.8565	0.28421	0.445125	0.23841		0.06782	0.564525	0.17903	0.985343
Russian. Federation	0.18961	0.7990594	0.0516	0.08291	0.432034	7.1E-05	0.067818		0.002253	0.05071	0.428494
Tajikistan	0.12616	0.0791435	0.02133	4.1E-05	0.101461	0.00169	0.564525	0.00225		0.74357	0.061442
Turkmenistan	0.04578	0.7625012	0.15162	0.794	0.993192	0.23888	0.17903	0.05071	0.743569		0.587211
Uzbekistan	0.00121	5.545E-06	0.00846	0.00013	0.468515	0.69397	0.985343	0.42849	0.061442	0.58721	

Note: author's elaboration made with the help of (R Core Team, 2022) on the basis of the data from (WITS-Comtrade, 2024).

Table 6

p-values for the Spearman Correlation Coefficients of the Analyzed Data

	Armenia	Azerbaijan	Belarus	Georgia	Kazakhstan	Kyrgyz Republic	Moldova	Russian Federation	Tajikistan	Turkmenistan	Uzbekistan
Armenia		1.1E-05	0.00182	5.3E-05	0.898	0.669	0.0403	0.309	0.0609	0.432	0.00164

Azerbaijan	1.1E-05		0.0472	4.9E-05	0.601	0.646	0.188	0.643	0.0231	0.443	2E-06
Belarus	0.00182	0.0472		0.0002	0.214	0.186	0.941	0.0418	0.00521	0.223	0.0734
Georgia	5.3E-05	4.9E-05	0.0002		0.399	0.204	0.552	0.201	3.3E-06	0.726	0.00033
Kazakhstan	0.898	0.601	0.214	0.399		0.00016	0.343	0.00198	0.0953	0.784	0.287
Kyrgyz Republic	0.669	0.646	0.186	0.204	0.00016		0.318	6.4E-06	0.0196	0.541	0.228
Moldova	0.0403	0.188	0.941	0.552	0.343	0.318		0.068	0.561	0.0814	0.926
Russian Federation	0.309	0.643	0.0418	0.201	0.00198	6.4E-06	0.068		0.0365	0.0425	0.199
Tajikistan	0.0609	0.0231	0.00521	3.3E-06	0.0953	0.0196	0.561	0.0365		0.868	0.0222
Turkmenistan	0.432	0.443	0.223	0.726	0.784	0.541	0.0814	0.0425	0.868		0.406
Uzbekistan	0.00164	2E-06	0.0734	0.00033	0.287	0.228	0.926	0.199	0.0222	0.406	

Note: author's elaboration made with the help of (R Core Team, 2022) on the basis of the data from (WITS-Comtrade, 2024).

Table 7

p-values for the Kendall Correlation Coefficients of the Analyzed Data

	Armenia	**Azerbaijan**	**Belarus**	**Georgia**	**Kazakhstan**	**Kyrgyz Republic**	**Moldova**	**Russian Federation**	**Tajikistan**	**Turkmenistan**	**Uzbekistan**
Armenia		0.000019	0.00132	0.000102	0.876	0.497	0.0335	0.172	0.0498	0.428	0.00107
Azerbaijan	0.000019		0.0292	0.000019	0.497	0.754	0.207	0.876	0.0219	0.428	1.38E-06
Belarus	0.00132	0.0292		0.000557	0.127	0.172	0.917	0.0292	0.0189	0.153	0.064
Georgia	0.000102	0.000019	0.000557		0.402	0.155	0.601	0.172	3.91E-06	0.561	0.000444

Kazakhstan	0.876	0.497	0.127	0.402		0.000557	0.402	0.00353	0.127	0.832	0.271
Kyrgyz Republic	0.497	0.754	0.172	0.155	0.000557		0.271	3.91E-06	0.0438	0.561	0.294
Moldova	0.0335	0.207	0.917	0.601	0.402	0.271		0.0335	0.497	0.101	0.917
Russian Federation	0.172	0.876	0.0292	0.172	0.00353	3.91E-06	0.0335		0.0498	0.0344	0.319
Tajikistan	0.0498	0.0219	0.0189	3.91E-06	0.127	0.0438	0.497	0.0498		1	0.0162
Turkmenistan	0.428	0.428	0.153	0.561	0.832	0.561	0.101	0.0344	1		0.397
Uzbekistan	0.00107	1.38E-06	0.064	0.000444	0.271	0.294	0.917	0.319	0.0162	0.397	

Note: author's elaboration made with the help of (R Core Team, 2022) on the basis of the data from (WITS-Comtrade, 2024).

All the issues related to economic and political relations between the CIS member states - both internal and external - are extremely topical, especially nowadays, due to the political tensions between some of its members, which sometimes take extreme forms, as seen in Georgia or Ukraine. Further research directions can include the interaction of the CIS with the other regional or supranational country unions, taking into account their reciprocal economic and political relations. The influence of the CIS member states participation in other country unions on their membership in the CIS could be another promising direction of the research development. The analysis of exports and imports - whether agricultural or industrial - both within the union and outside it, would be also interesting for further research. Despite a wide range of the possible topics for continuing this research, certain limitations exist, such as the low statistical transparency of certain Central Asian countries, the war going on in Ukraine, political demonstrations going on in Georgia, and others. All these factors hinder access to the up-to-date statistical data, preventing future research from being sufficiently comprehensive and robust. On the other hand, current political, economic and social developments in the analyzed countries make either the presented research or its potential expansion not only highly relevant for discussion and further development, but also useful for all the subjects functioning within and beyond the researched countries.

5. CONCLUSIONS

Countries unite themselves in different union types for several reasons. The most frequently announced objectives include peacekeeping and stability, stronger political position vs other global and regional political players, partial or complete removal of borders for different purposes, etc. The aims for the CIS creation were also more than noble. These were to facilitate and strengthen cooperation among its member states in the political, economic, ecological, humanitarian, cultural, and other fields (digwatch, n.d.). Despite that, the role and importance of the CIS has been gradually declining after 2000 as most of its member-states have firmly stepped on transition paths and formulated their own geopolitical priorities (Makhanov, n.d.).

At the same time, having been part of a single state for approximately seventy years fostered shared historical traditions and a similar mindset among the member states. That, in turn, could help elevate the CIS from being an artificially maintained regional union to the higher level, if not for the imperialistic ambitions of its largest member. Along with the changes in the political forces' deployment, the economic relations in general and the trade ones in particular have changed as well. The results of the mentioned changes can be seen either in the shade maps or in Table 2 presented in the given article. They are also obvious in the changes of the lists for the agri - food products

imported by Ukraine from 11 analyzed CIS member states). They point to the change of the agri - food imports preferences of Ukraine, caused, mainly, by the war, directly or indirectly. And, consequently, they indicate the shift of the Ukrainian agri - food imports partners preferences from the Russian Federation and Belarus to the Central Asian and Caucasian countries. It would be mistaken to consider the said shift just the consequence of only one single factor, rather a combination of such. Although some factors - as war - include so many sub-factors going along with it, that could make them decisive as they have had such a huge impact on the agri - food trade between the CIS member states.

Another way to assess the economic and political relations between the CIS member states is the calculation of the Pearson, Spearman and Kendall correlation coefficients for the agricultural products imports values data from the mentioned countries to Ukraine. According to the results of the Pearson, Spearman and Kendall correlation tests , as well as their corresponding *p*-values and comparitive analysis, the agricultural products imports to Ukraine from the following countries pairs appeared to be correlated to the following degrees: Armenia with Belarus (moderate to strong positive), Georgia (moderate to strong positive), Moldova (weak to moderate positive) and Uzbekistan (moderate to strong positive); Azerbaijan with Georgia (strong positive) and Uzbekistan (strong positive); Belarus with Georgia (moderate to strong positive) and Tajikistan (weak to moderate positive); Georgia with Tajikistan (strong positive) and Uzbekistan (moderate to strong positive); Kyrgyz Republic with the Russian Federation (strong positive). It should, nevertheless, be added, that the correlation doesn't automatically mean causation. Thereby the stated hypothesis can be declared to be confirmed, with the research results pointing to the changes in the agro imports structure of the subjects under research. That was caused, majorly, by the changes in the geo-political relations of the mentioned subjects. Such a strong influence of geo-politics on geo-economics in general and agro products trade in particular should be a kind of a ringing bell for the decision makers to take into consideration the geo-political issues while making geo-economic decisions and vice versa.

The research presented in the given paper is just the first step of a much bigger research on either the economic or political relations between the CIS member states, either current or ex ones. Being placed territorially on two continents, the mentioned union goes far beyond being just a regional union, having had and still having its impact on all the functioning spheres of the subjects/countries located not only on the said continents but further away. The research and its results would be of interest for the public administration officials, dealing either with the agricultural production or trade, as in the European, the Central Asian and Caucasian regions, small farmers and big agro holdings managers, indulged into the agricultural production, small and big agro

traders, politicians and decision makers of all the power levels, academic society representatives as well as statisticians and data analysts.

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