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## **Structural and Dynamic Changes in International Trade in Agricultural Products in Ukraine**

**Abstract.** The article is devoted to studying the structural and dynamic changes in international trade in agricultural products in Ukraine. The authors reveal the theoretical essence of international trade in agricultural products, considering export and import conditions in light of modern challenges. The assessment of the foreign trade regime is provided and the trends and impact of implementing the Agreement on Association between Ukraine and the EU on the development of Ukraine's foreign trade are established. It was found that, on one hand, the export orientation of raw materials to the EU crop production market has increased, while on the other hand, there remains a high import dependence on prepared food products, with a more diversified import structure. The peculiarities of key directions of Ukraine's agro-industrial market under martial law and its place in the global food security system are described. The article also examines the structure of Ukraine's trading partners, which have been revised since the beginning of the war. The peculiarities of cooperation between Ukraine and the EU in international trade in agricultural products are analysed. Ways of diversifying exports and increasing the profitability of foreign trade in agricultural products from Ukraine in the EU market are suggested.

**Key words:** international trade, Agreement on Association, world market, foreign activity, regulation, competitiveness

**JEL Classification:** F140, F14; O19; Q17

### **Introduction**

Despite the war in Ukraine, the agro-industrial complex is one of the most dynamic and promising sectors for development. We can observe growth in production volume and the creation of special conditions to increase the export of agricultural products to the global market. Particularly noteworthy are the producers from Ukraine and their decisive role in the global agricultural products market. The functioning of the grain corridor has become a prerequisite for shaping the innovative strategy of agro-industrial companies in Ukraine, which will enhance the overall efficiency of the economy. The agricultural food market has always been significant for Ukraine in its export structure and in forming the country's budget. Despite the martial law in 2022, production did not halt; on the contrary, there was an increase in production volume, the creation of conditions to boost exports and gradual reduction in the import of agricultural products. The rapid recovery of the agro-industrial complex, the establishment of opportunities for product export and the

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functioning of the grain corridor are crucial for the social and economic development of Ukraine, post-war reconstruction and ensuring its continued operation.

In the era of globalisation, a single economic system is emerging, characterised by asymmetrical development of its elements due to the peculiarities and differences between countries during their integration processes. The primary objective is to ensure the efficient functioning of economic systems, minimise risks and address negative tendencies arising from global transformations.

One of the most pressing issues is to slow down and prevent the deepening of the global food crisis. Import protection policies, domestic support and price interventions remain essential in many developing countries and with their influence increasing, reflecting the growing importance of these nations in international markets and trade.

The aim of this research is to examine the structural and dynamic changes in international trade of agricultural products in Ukraine and to develop approaches to activate foreign economic activity.

The main tasks of the research are:

- to study prerequisites, stimulating and inhibiting factors for the development of international trade in agricultural products by assessing the existing objective factors of influence and current geopolitical risks;
- to analyse the volume and structure of agricultural product exports and imports;
- to define ways and measures for domestic agribusiness entities to enter the international agricultural food market.

## **Materials and methods**

The analysis of structural and dynamic changes in the international trade system for agricultural products was conducted using Ukraine as an example. In the unstable conditions resulting from Russia's full-scale invasion of Ukraine, the introduction of martial law, sea blockades and other negative factors, it is important to explore alternative ways of realising export potential by utilising all possible levers, methods and logistic supply chains.

The informational database for structural and dynamic changes in the international trade system for agricultural products is based on official statistics from the State Statistics Service of Ukraine, official reports and analytical materials from international and national organisations such as the World Trade Organisation (WTO), UNO committees (UNCTADstat, FAO, Trade Map), the statistical organisation of the European Committee (Eurostat), the International Monetary Fund (IMF), the Ministry of Agriculture of the USA (USDA), Global Trade Alert, as well as our own research materials.

The scale of Ukraine's international trade relies on logistic interactions within the entire food chain. Each region, with its specific natural and economic conditions and the number of branch enterprises available, directly or indirectly shapes the international trade commodity structure of the region and the country.

To achieve the set goal and address the tasks, various scientific research methods were employed, including induction and deduction to examine the theoretical and methodological foundations of forming and developing the global agricultural market, historical and logical methods to explore the evolution of the global food market, the method of systematic generalisation to summarise existing theories of international trade in

agricultural products and identify their pros and cons, analysis and synthesis methods to define the drivers behind the formation of a globalised commodity agro-food market and neo-protectionism in modern markets, comparative analysis methods to investigate the characteristics of global and national agro-food structures, systematic and structural methods to explore current trends and structural changes in the global agricultural market, econometric assessment methods and economic-mathematical modelling to identify patterns and simulate scenarios for transforming the national agricultural market under changing international trade policies and graphical methods to visually present the research findings.

These chosen methods are expected to facilitate a more in-depth analysis and evaluation of the structural and dynamic changes in the international trade system for agricultural products.

The article utilised economic-statistical methods to generalise statistical information on the volume of Ukrainian exports, specifically products from the agro-industrial complex. The assessment of Ukrainian exports under martial law was conducted through elementary-theoretical analysis and synthesis and alternative routes for exporting agricultural commodities to various regions of the world were summarised based on expert evaluations.

These methods helped to examine the structural and dynamic changes in Ukraine's international trade system for agricultural products, organise statistical data on export and import volumes for individual groups of agricultural products, define directions for agribusiness development at the current stage and establish causal relationships between changes in enterprise foreign economic activities and socio-economic processes in the country.

## **Literature review**

The issues involved in determining the prospects of Ukraine's agricultural integration into the global agricultural market are quite complex. Ukrainian scientists have extensively researched these matters, which are well-documented in economic literature. For instance, Luppenko Yu.O. outlined the directions of economic research into the international integration of Ukraine's agricultural sector. Puhachov A.O. and Melnyk H.S. focused on identifying potential advantages and risks within the development of Ukraine's agro-industrial complex, considering integration options with the European and Custom Unions. Tymofiyeva H.S. examined the modern integration of Ukraine's agricultural sector into the globalisation process, highlighting key agricultural products that impact Ukraine's position in the world market. Negrey M., Trofimtseva O. studied the functionality of Ukraine's agricultural sector during wartime conditions. Hubeni Yu. and Tsiolkovska S. proposed strategies to enhance the foreign economic activities of agricultural enterprises. Nechyporuk A., Kotova M., Kochubey D. identified the main trends in Ukraine's exports during martial law.

Various aspects of Ukraine's agricultural integration prospects are explored in numerous research papers. Despite the widespread research on this topic, further in-depth examination is required to understand the future integration of Ukraine's agriculture into global markets. Establishing key strategies to strengthen Ukraine's position in global agricultural markets within the current context of international economic integration is crucial.

The export of products from the agro-industrial complex, a cornerstone of Ukrainian exports, under martial law attracts attention not only from Ukrainian researchers, but also from scholars worldwide. The issue of food security has become increasingly urgent, leading to discussions among international organisations. Researchers such as Rose A., Zhenhua Ch. and Dan V. have evaluated how the Russia-Ukraine conflict directly impacts grain exports, causing economic repercussions worldwide. This situation could potentially trigger a global food crisis as Ukrainian grain exports play a significant role in ensuring food security. These authors extensively analysed the effects of reduced grain exports on macroeconomic indicators across different regions (Rose, Zhenhua, Dan, 2023).

Ay Kh. and Soylemez A. underscore the importance of the Black Sea grain initiative for Ukrainian grain exports and assess Turkey's policy during the agreement negotiations (Ay and Soylemez, 2023). Ahn S., Kim D. and Steinbach S. have demonstrated the adverse effects of Russia's invasion on global grain and oil crop trade, leading to significant price fluctuations and posing threats to global food security (Ahn, Kim, Steinbach, 2022).

Researchers at the Kyiv School of Economy, experts from the Ukrainian Agrarian Business Club and officials from the Ministry of Foreign Affairs of Ukraine are conducting detailed studies on agriculture under martial law. The impact of Ukraine's agricultural sector on global agricultural markets and food security is also being investigated by foreign scholars (Banse, 2022; Campeanu, 2022; Celi et al., 2022; Fiott, 2022; Glauben et al., 2022; Ghosh and Bhowmick, 2022; Oxford Analytica, 2022; Peterson, 2022).

Nevertheless, the current situation, characterised by instability and disruptions in Ukrainian export supply chains, necessitates a more thorough examination of these issues, particularly within the context of martial law.

## Results

Russia's invasion of Ukraine exposed and exacerbated tensions in global agricultural markets that had arisen during COVID-19. The critical need for creating stable food markets became evident. According to World Bank data for April 2022, the war in Ukraine altered global trade, production and consumption models in a way that will maintain historically high prices until the end of 2024, increasing food security and inflation. In response to new threats, on June 28, 2022, G7 countries established the Global Alliance for Food Security, committing an additional \$4.5 billion to protect the most vulnerable populations from starvation and malnutrition. This brings the total joint commitment to over \$14 billion for food security this year. The newly formed Alliance also pledged support for Ukraine in recovering its agricultural exports, establishing a safe sea corridor across the Black Sea and creating alternative routes for Ukrainian exports. The European Union and Great Britain strongly supported Ukrainian agrarian producers by lifting import restrictions, including tariff quotas.

The agricultural sector of Ukraine suffered significant damage. According to the Kyiv School of Economics' calculations, direct losses in the agricultural sector over three months of war amounted to \$4.3 billion, with estimated indirect losses at \$23.3 billion (KSE Agrocentre, 2022). The main problems faced by the agricultural sector due to military operations in Ukraine are as follows:

- Ukrainian territory occupation: destruction of production capacities and infrastructure, issues with organising the sowing campaign, shortage of fodder for

animals, halting of agricultural enterprises and a large number of mined areas (approximately 100,000 hectares in the Chernihiv, Luhansk, Donetsk, Kharkiv, Kherson, Zaporizhzhia and Kyiv regions);

- Logistic problems: blocking agricultural products export routes (ports, in particular), destroying transport infrastructure, disruption/desynchronisation of logistic chains both inside the country and abroad;
- Reducing the volume of the domestic market and decreasing the purchasing power of the majority of Ukrainians have led to a shortage of meat and dairy products consumed by Ukrainians. This trend was already observed before the war but has significantly increased during the conflict;
- Lack of resources for agricultural production: shortage of fuel, certain types of fertilisers, lack of fodder, plant protection products, problems of material and technical support, as well as the increase in prices for means of production in the agricultural sector;
- Workforce issues: internal and external migration, mobilisation to the Armed Forces of Ukraine, rising unemployment, psychological personnel problems, working in constant stress and threat;
- Stealing Ukrainian agricultural machinery and products: grain (more than 600,000 tonnes), oil, vegetables, fruits, etc.

Due to the aforementioned issues in the agricultural sector, there has been a rise in the prices of agricultural products. These problems currently persist and require immediate resolution. However, new challenges may also emerge in the future. According to the Ministry of Agrarian Policy, next year's harvest could decrease by up to 40% due to Russia's full-scale invasion. Ukraine has already lost 25% of its arable land.

It is important to consider that Ukraine plays a crucial role as a supplier of agro-food products overall and especially in grain production. Global reports acknowledge these trends in the agricultural market. The World Food Organisation forecasts that global agricultural production in 2022 may surpass consumption. The world grain market balance is outlined by the indicators in Table 1.

Table 1. Characteristics of world grain market, mln t

Direction	2020/2021	2021/2022	2022/2023	Changes 2022/23 compared to 2021/2022
Production	776.7	776.8	770.8	-0.8
Trade	189.2	192.1	188.9	-1.7
General usage	762.4	771.7	768.6	-0.4
Nutrition	525.5	531.3	535.9	0.9
Fodder	148.0	149.8	143.7	-4.1
Other users	88.9	90.6	89.0	-1.8

Source: made by the authors according to the materials (Câmpeanu, 2022).

In accordance with the World Food Organisation, main production will be concentrated in China, Russia and Ukraine, with reserves being reduced in the countries of Africa and Asia. In general, there is an observed reduction in trade in grain by 189 million tons (1.7%) compared to the 2021/2022 season.

Table 1 shows that alongside the decrease in production in 2022/23, a slight decrease in the total use of cereals by 0.4% is also forecasted. This situation is caused by a drop in

the level of food demand for the studied products, particularly for wheat and corn. Regarding food consumption, it is expected to grow by 0.9% in line with the increase in the population. Despite a slight reduction in the demand for grains, their production is not able to cover it completely, which in 2022/2023 led to a reduction in feed use by 4.1%.

The key reasons for the reduction are the blockade of Ukraine as a result of hostilities and the ban on exports from India (Banse, 2022). Ukraine is a significant exporter in the world food market and was one of the key players in exports before the war.

According to UNCTAD research, grain exports from Ukraine have almost stopped due to the war. To address the global food crisis in 2022, the Black Sea Grain Initiative (BSGI) was formed as part of restoring Ukrainian grain exports across the Black Sea to world markets. It enabled the poorest countries to access food, stabilise world grain prices and create an additional channel for funds to flow into the Ukrainian budget. Before the war, the agricultural food market held the second position in terms of export revenues in Ukraine's economy, following the metallurgical complex. Based on data from the State Statistics Service, there was a significant increase in goods in 2021 compared to 2020 – by 34%, amounting to \$72.82 billion. Additionally, exports increased by 38.4% to \$68.09 billion (KSE, 2022). The foreign trade balance was negative in 2021 and 2020, but trade operations were conducted with more than 200 partner countries. In 2021, China was the most active partner for Ukraine's exports, receiving goods worth \$8 billion, a 12.7% increase from 2020. Poland ranked second with \$5.23 billion, a record growth of 59.7% compared to 2020 and Turkey was in third place with exports increasing by \$4.14 billion, which is 70% higher than in 2020. The export structure includes ferrous metals, sold for \$13.95 billion, an 81.45% increase compared to 2020. Grain exports amounted to \$12.34 billion, showing an increase of 31.2%, while vegetable and animal fats and oils were exported for a total value of \$7.04 billion, a 22.5% increase compared to 2020.

Despite the factors mentioned above, the Ukrainian agrarian sector is still thriving and continues to maintain a leading position in world trade. Comparative research between the 2021-2022 marketing year and the 2022-2023 marketing year is presented in Tables 2-3.

Table 2. Ukraine agricultural exports (2021 calendar year)

Product	Value	Top markets		
Sunflower oil	\$6.4 billion	India \$1.9B	EU \$1.9B	China \$0.9B
Corn	\$5.9 billion	China \$1.9B	EU \$1.8B	Egypt \$0.5B
Wheat	\$5.2 billion	Egypt \$0.9B	Indonesia \$0.7B	Turkey \$0.4B
Rapeseed	\$1.7 billion	EU \$1.1B	Pakistan \$0.2B	UK \$0.2B
Barley	\$1.3 billion	China \$0.7B	Turkey \$0.2B	Saudi Arabia \$0.1B
Sunflower oilcake	\$1.2 billion	China \$0.6B	EU \$0.3B	Belarus \$0.1B
<b>TOTAL</b>	<b>\$27.8 billion</b>	<b>EU \$7.7B</b>	<b>China \$4.2B</b>	<b>India \$2.0B</b>

Source: Trade Data Monitor LLC.

Table 3. Ukraine agricultural production and exports (2022/23 marketing year)

Product	Production			Exports		
	Volume (1,000 MT)	Rank among global producers	% of global production (%)	Volume (1,000 MT)	Rank among global exporters	% of global exports
Corn	25,000	#8	2.1	9,000	#4	4.9%
Wheat	21,500	#9	2.8	10,000	#8	4.9%
Sunflower	9,500	#3	19.3	750	#1	20.7%
Barley	5,700	#7	3.9	1,800	#6	5.9%
Sunflower Oil	4,085	#3	21.4	3,600	#1	34.7%
Sunflower Meal	3,924	#3	19.0	2,700	#1	39.8%
Rapeseed	3,200	#6	4.0	2,750	#3	16.6%

Source: USDA WASDE and PSD Database, updated June 10, 2022.

The assessment of Ukraine's commodity export structure during the period 2021-2022 indicated a total export reduction from \$68.08 billion in 2021 to about \$44.18 billion in 2022, a decrease of 35%. Despite the general declining trend, the export share of agro-industrial complex products in the total commodity flow significantly increased due to international cooperation in addressing the global food problem. It is estimated that the export share rose from 39% in 2021 to about 51.7% in 2022 (Celi, Guarascio, Reljic, Simonazzi & Zizza, 2022). In the context of the international agreement to establish a grain corridor, it is logical and expected that the commodity grain group ranked first in terms of export volume in 2022, despite a recorded reduction in grain exports of 26.2%. Additionally, the export volume of oilseeds and fruits increased by 54.4% during the period under study.

Overall, 2022 could have been the most efficient and successful year in terms of product exports. The beginning of the year showed significant positive dynamics compared to the successful 2021 and with January-February already demonstrating a 34% increase. However, following the Russian invasion of Ukraine, exports sharply declined, with a drop of over 50% recorded in March. A gradual recovery became possible from May onwards, after Ukrainian ports were unblocked and the grain corridor was established. By September 2022, Ukrainian exports had reached \$33 billion, reflecting a decrease of more than 30% compared to 2021. For example, in September alone, a record \$4.144 billion was demonstrated, marking the best result since February 2020.

During the conflict, the European Union emerged as the key trade partner, replacing China due to logistical challenges, political relations, China's stance during the conflict and Ukraine's losses in the metallurgical complex. In September 2022, China only ranked fourth in the export partner structure. Poland and Romania became Ukraine's key trading partners, contributing to about 23% of exports. Presently, Russia is not considered a market for Ukrainian goods and restoring relations is not anticipated. The European Union's share in Ukraine's export structure increased from 41% in 2021 to 62% in 2022. Turkey, China and India became other significant trade partners.

The rapid growth in agro-food exports since 2016 (Figure 1) was primarily driven by Ukraine's accession to the European Free Trade Area. With the application of the Agreement by the EU for agricultural products, duties within the tariff quotas were

abolished, resulting in a growth rate of total agricultural exports of 4.9% in 2016, 16.2% in 2017, 4.8% in 2018 and 19.0% in 2019 (WASDE, 2022).

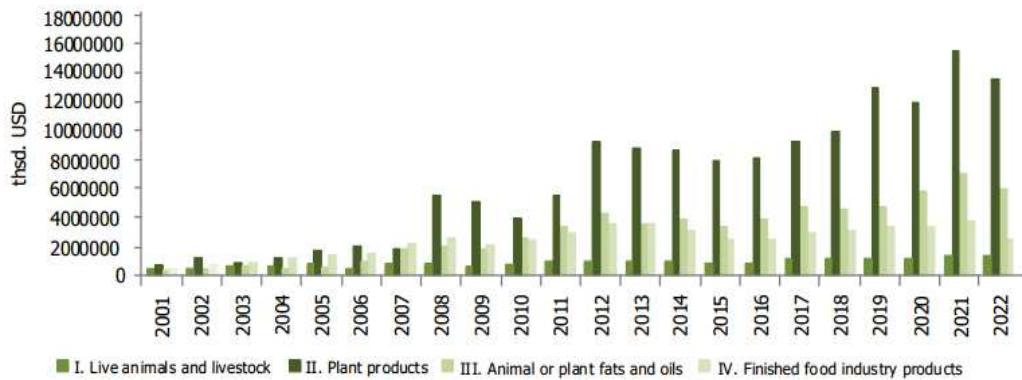


Fig. 1. Dynamics of Ukrainian agricultural exports in 2001-2022

Source: World Agricultural Supply and Demand Estimates, 2022.

It is worth noting that even in the unfavourable conditions of the global pandemic COVID-19 in 2020, Ukraine's total agro-food exports did not decrease but remained at the previous year's level (increased by 0.2%). However, the export of products of animal and plant origin decreased by 7.0% and 8.0%, respectively, while the export of fats and oils and the commodity group "finished food products" increased by 21.4% and 4.4%, respectively. This indicates the high level of stability in the domestic agricultural sector during global crisis processes, the steady external demand for these products and the significance of the domestic agrarian sector in the agro-industrial complex for generating foreign currency revenues for the state.

Detailed analysis of commodity and geographical structure of the national export enables the identification of the main importers of Ukraine's agro-industrial complex products. Currently, the European Union accounts for 55.6%, the Asian region for 32.2% and African countries for 7% of the biggest importers of agricultural sector products. To illustrate the export flows of agro-products in terms of shares in the total Ukrainian export of agro-industrial complex, the following countries can be highlighted (Figure 2).

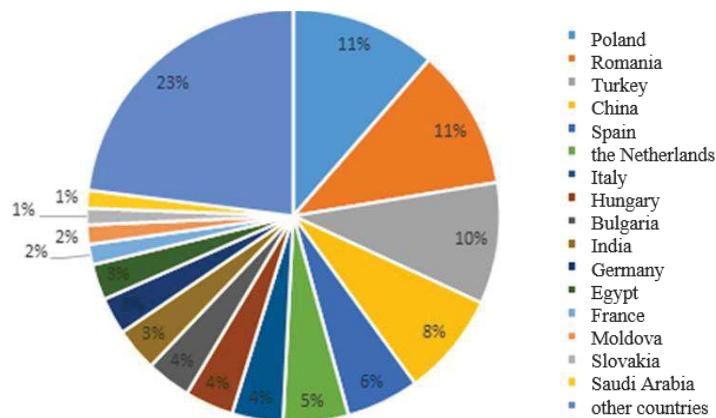


Fig. 2. Geographical structure of Ukraine's agricultural products export in 2022, %

Source: State Statistics Service of Ukraine, 2023.

Again, Poland takes the first position with 11.4%, Romania is second in the ranking with 11.0%. The rest of the countries are: Turkey (9.5%), China (8.1%), Spain (5.7%), the Netherlands (5.1%), Italy (4.0%), India (3%), Germany (3%) and Egypt (5%).

In 2022, Ukraine imported agricultural products worth \$6.3 billion, which is 23% less than in 2021. According to Customs Service data, agricultural products worth \$6.3 billion were imported into Ukraine in 2022, a 23% decrease from 2021 when agro-food imports amounted to about \$8.2 billion. Due to Russia's full-scale invasion of Ukraine, the cost of supplies from the European Union decreased by 17%: from \$4064 million in 2021 to \$3376 million in 2022. At the same time, the EU countries' share exceeded half of domestic agro-food imports, amounting to 53.3%.

At the same time, purchases in other regions also decreased. The volume of imported food supplies from Asian countries amounted to \$1237 million (19.5%), from Latin America – \$421 million (6.6%), Africa – \$242 million (3.8%) and CIS – \$205 million (3.2%).

Since 2017, Poland has held the first place in the ranking of the main suppliers of agricultural products to Ukraine. Last year, it sold agricultural goods worth \$881 million to Ukraine, almost matching the 2021 figure of \$883 million.

The following countries also played significant roles in domestic imports: Turkey (\$538 million), Germany (\$449 million), Italy (\$391 million), the Netherlands (\$267 million), France (\$237 million), Norway (\$225 million), Spain (\$198 million), the United States of America (\$194 million) and China (\$193 million). Overall, these ten countries accounted for more than 56% of all imports last year.

In the structure of foreign supplies of agricultural sector goods to Ukraine, several product groups traditionally dominate:

- fruits, berries and nuts (\$663 million);
- fish and sea products (\$627 million);
- alcoholic and non-alcoholic drinks (\$490 million);
- various food products (\$416 million);
- tobacco products (\$368 million);
- residues, fodder for animals (\$362 million);

- oil seeds and fruits (\$359 million);
- vegetables (\$353 million).

These products formed more than 57% of the value of agricultural products import to Ukraine.

Despite statements by the European Commission and relevant EU institutions about the absence of any risks and negative impacts of agricultural exports from Ukraine to European markets, certain countries, especially our neighbours, insist on a complete ban or at least significant limitations on such supplies. This includes both the introduction of their own blocking measures, the essence and mechanism of which contradict not only international trade rules and provisions of the Association Agreement with Ukraine, but also the EU's internal regulations and. There is also pressure on the European Commission to introduce general restrictions on the supply of Ukrainian agricultural products.

Motives vary: for some countries, it is a principled protectionist position to support national producers, while for others, it is about their own economic interests. Some have political goals and tasks with different motives. Perhaps in some cases, it is about supporting local producers.

In pursuing their goals, opponents of Ukraine's increased influence on agricultural and consumer markets overlook the interests of European bloc partners. For them, the supply of agricultural raw materials from Ukraine is an almost irreplaceable source for developing entire sectors of their production and adding value and. Importing finished products also ensures food security and lower prices for the population.

It is worth mentioning that before the war, when trade volumes with the EU were regulated by customs duties and quotas, the European market was not our main or primary focus. On one hand, it primarily requires premium goods. On the other hand, it has slightly different standards for finished products, while Ukrainian agricultural production (especially grain) is aimed at developing markets. Logistic problems resulting from Russian aggression against our country changed the situation.

When our agricultural products enter the EU market, they are not distributed evenly among all 27 EU member countries – some receive more, others less, depending on how each state satisfies its own needs for specific commodities. This explains the differences in how imports from Ukraine are treated. While the European Union has no issue with it, individual countries may experience distortions based on their import-export balance and consumption patterns. Each market may find a specific product to be an irritant. Ukraine's advantage lies in its production scale. In the EU, the average farm size is 17 hectares, while Ukraine's agricultural sector comprises various groups of agricultural enterprises, including large "giant" holdings, sizable agricultural enterprises and farms. These farms typically range from 50 to 100 hectares, which is relatively large compared to the EU's average farm size of 17.4 hectares. The largest agricultural holdings lease more than 250,000 hectares of land and aim to increase this to 350,000 hectares or more. In this context, defining the average farm size offers limited insight into the scale of agricultural enterprises in Ukraine.

By European standards, our small farmer would be considered medium or large. Today, we are discussing not only our agricultural holdings but also small and medium-sized producers who, thanks to their scale, can reduce production costs.

## Conclusion

International trade is one of the main factors in Ukraine's economic development, but under martial law, it serves as an indicator of economic stability and the country's trade potential reliability. The analysis of changes in the export commodity structure and its geography under martial law shows a shift towards European Union countries and an increase in the export volume of agro-industrial complex products. Contributing to this shift are the signing of the Black Sea Grain Initiative and the establishment of Ways of Solidarity by the European Commission to enhance the connectivity between Ukraine and the European Union countries.

Nevertheless, the constant threat of disruptions in the available agricultural goods export routes, which are essential under martial law, necessitates a more thorough analysis of all alternative transportation options for this type of cargo.

Exploring new logistic routes that can utilise railways, roads, ferries and maritime transportation will help achieve the required export volumes of agro-industrial complex goods and mitigate risks arising from instability. Developing intermodal transportation is a viable logistics alternative and harnessing the benefits of both land and maritime transport modes will optimise the logistic routes for Ukrainian exports.

The development of agricultural goods export transportation requires further research considering the instability and adverse conditions of martial law, as well as the potential for post-war reconstruction of established routes with a focus on European markets.

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