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# Sustainable Marketing of Ukrainian Agricultural Enterprises to Enter Global Grain Markets.

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**ABSTRACT**:
The article provides a study of current issues regarding the role of Ukraine in the world grain trade and the challenges caused by current conditions. The potential of the Ukrainian grain market and its position against the background of global ratings of producers and exporters are analyzed. Key risks for the grain sector are identified. The commodity and geographical structure of grain exports during wartime is studied, and the strategic importance of Ukrainian grain for ensuring global food stability is emphasized. The impact of the imbalance between supply and demand and fluctuations in world prices for grain crops is outlined. Price dynamics were analyzed and it was determined that the likely price increase could have serious consequences for global food markets, in particular for low-income countries that could face a food crisis. A set of measures aimed at minimizing the negative impact of the war on global food security, including in connection with a possible grain shortage and further price increases, has been proposed.

*Keywords: foreign market, grain, world exporter, economy, marketing strategies, agricultural sector, world community, food security.*

## 1. Introduction

The relevance of marketing strategies of Ukrainian agricultural enterprises when entering global grain markets is determined by a number of economic, competitive, and geopolitical factors. In today's global grain trade environment, domestic enterprises face a high level of competition, which requires effective approaches to product positioning and establishing international partnerships. Global grain markets, in turn, are characterized by dynamism, changes in demand, regulatory restrictions, and the influence of global economic and political trends. An important aspect is compliance with international quality standards, certification requirements, and environmental regulations, which affects the competitiveness of Ukrainian agricultural enterprises.

Marketing strategies play a key role in shaping an effective export policy, expanding the geography of supplies, and increasing the visibility of Ukrainian grain in international markets. They contribute to the optimization of logistics processes, the selection of the most profitable sales channels, and the development of flexible pricing mechanisms taking into account fluctuations in market conditions. The digitalization of marketing approaches also plays a significant role, allowing domestic enterprises to quickly analyze market trends, forecast demand, and adapt export strategies. The use of modern marketing tools,

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including branding, digital marketing, and participation in international exhibitions, helps strengthen the position of Ukrainian producers in the global grain sector.
Given the economic importance of the agricultural sector for Ukraine, the development and implementation of effective marketing strategies is a necessary condition for the successful entry of domestic enterprises into global grain markets and ensuring their sustainable development.

## 2. Analysis of recent research and publications

The study of the development of marketing strategies of agricultural enterprises and the grain market is devoted to the work of many scientists, economists and researchers, in particular: I. Goncharuk [13], L. Pronko [11,15], Ya. Gontaruk [11], I. Tomashuk [10], S. Kozlovsky [18], A. Maslak [1], O. Tymchenko [10], O. Samborska [15], T. Kolesnyk [15], M. Hamulchuk M. [14] and others. The accumulated theoretical and methodological material in the field of the world grain market served as the basis for research in this area. It should be noted that the lack of stability in the agricultural sector and the need to introduce effective forms of production require in-depth study of specific units and comprehensive development of agricultural mechanisms to improve their activities [1].

## 3. Materials and methods

The purpose of the article is to determine the relevance of marketing strategies of Ukrainian agricultural enterprises in the process of entering global grain markets. The article analyzes key factors affecting the competitiveness of Ukrainian grain producers at the international level, and also examines the effectiveness of various marketing approaches. The main emphasis is on the importance of adapting to global market conditions, the use of modern marketing tools and digital technologies, as well as the need to comply with international standards. The study examines strategic aspects of grain promotion, logistics optimization, establishing partnerships, and building a positive image of Ukrainian grain on the world stage [2].
The basis for conducting the study was the scientific works of scientists in the field of research into marketing strategies of agricultural enterprises in the process of entering world grain markets, the Ministry of Agrarian Policy and Food of Ukraine, the State Statistics Service of Ukraine, Agrarian News of Ukraine and the World, etc.
The methodological basis of this study was general scientific and special analysis methods, which allowed us to comprehensively assess the marketing strategies of Ukrainian agricultural enterprises in the process of entering global grain markets. The study used systems analysis methods, which allowed us to consider the factors influencing the export activities of the agricultural sector in their interaction. Comparative analysis methods were applied to assess the competitive positions of Ukraine in the global grain market and determine effective marketing strategies of leading exporting countries. Statistical analysis was used to study the dynamics of grain exports, changes in demand, pricing, and the structure of the world market. Economic forecasting methods allowed us to assess the potential for further development of Ukrainian grain exports, taking into account

marketing trends. We also used the element of SWOT analysis to identify the strengths and weaknesses of the marketing strategies of Ukrainian agricultural enterprises, as well as the opportunities and threats that affect their activities in the international environment. The methodological approach is based on a combination of theoretical generalizations with a practical analysis of market conditions, which allows us to obtain a comprehensive understanding of the effectiveness of marketing strategies in the context of Ukraine's entry into global grain markets.

## 4. Results

The relevance of the topic of Ukraine's entry into world grain markets is determined by several key factors. Let's look at them in more detail. Firstly, Ukraine is one of the leaders of the global grain market and is among the top 5 global exporters of grain crops, in particular: wheat (6-7% of global exports), corn (up to 15% of global exports), barley (up to 12% of global exports), which makes it an important player in ensuring global food security. Secondly, Ukrainian grain is the basis of food stability in many countries in Africa, the Middle East, and Asia. According to the UN, more than 400 million people depend on Ukrainian grain. Any disruptions in supply could lead to a food crisis in vulnerable regions. Third, global trends, including climate change, declining grain production in some regions, and growing demand, create favorable conditions for Ukraine. Entering new markets and strengthening positions in the EU, Asia, and Africa open up additional opportunities for the development of the agricultural sector. Fourthly, we note that speaking about the mutually beneficial potential of cooperation in the context of the parties for Ukraine - here too there are interests, namely: the agricultural sector provides about 41% of the country's foreign exchange earnings. Successful grain exports stimulate economic development, support jobs, and contribute to the financial stability of the state [3].

The differential access to resources among Ukrainian agribusinesses has a significant impact on their ability to digitise and certify their products, including grain for export. Let's focus on the main aspects of influence. In Table 1, we analyze the indicators that have the ability to significantly influence the digitization and certification of Ukrainian grains.

**Table 1.** Indicators of impact on the digitization and certification of Ukrainian grains

| Indicator | Extensive access to resources | Limited access to resources |
|---|---|---|
| Finances | They can invest in IT solutions, laboratories, certification | Limited budget, priority is survival, not development |
| Technical base | There is access to digital systems, sensors, analytics | Using manual or outdated methods |
| Qualified personnel | IT specialists, certification managers, agronomists with experience | Limited staff, often without special training |
| Digital tracking | Can implement QR codes, blockchain, GPS monitoring | No or limited traceability of grain origin |
| Certification (HACCP, ISO) | International certificates are present | There is no certification or only basic certification |

| | | |
|---|---|---|
| Access to markets | Europe, Asia, USA – premium markets with high demands | Export restrictions or low-margin markets |
| Traders' trust | High, due to transparency and quality control | Low, need for additional checks |
| Support/grants | There are resources for participating in international programs | Often lack the ability or information to seek help |

*Source: [4].*

Analyzing the table, it is clearly seen that finances, human resources, technical infrastructure, and access to certification are key factors in successful digitalization and certification. Businesses that have access to these resources turn them into competitive advantages in the global marketplace. But what will be the consequences for enterprises with limited resources? Small and medium-sized farms: often lack the technical and human resources to undergo international certification; use manual or outdated approaches to accounting and quality control; lose access to high-margin markets due to distrust from traders and buyers. This limits their export capacity, income and development opportunities. At the same time, enterprises with wide access to resources have corresponding advantages, adapt faster to market changes (in particular, digital control of the origin of products in wartime conditions); enter more profitable markets (EU, North America, Japan); have a reputational advantage and a stable export channel due to transparency.

Ukraine possesses a large area for agricultural production, which can both meet food needs [5]. In the period from 2022 to 2024, Ukrainian agricultural enterprises actively developed and implemented marketing strategies for successful entry into global grain markets. This was due to both internal and external challenges that required adaptation and the search for new approaches to product sales. As noted above, in modern conditions, Ukraine's entry into global grain markets requires flexible and effective marketing strategies. Given global competition, geopolitical risks, and changing logistics, key strategic approaches may include: *diversifying sales markets*. Expanding presence in new regions (Asia, Africa, Latin America). Strengthening cooperation with traditional partners (EU, China, Turkey, Egypt). Use of international trade agreements and initiatives (UN Grain Initiative); *logistics optimization*. Use of alternative export routes (Danube ports, rail corridors through Europe); Investments in the modernization of grain elevators and transport infrastructure; search for partnerships for the development of logistics hubs in importing countries; *formation of a positive brand of Ukrainian grain*. Product certification according to international standards; promotion of the quality and environmental friendliness of Ukrainian grain; use of digital marketing to increase brand awareness; *pricing strategy*. Flexible pricing policy taking into account market conditions; use of forward contracts and exchange-traded risk hedging mechanisms; offering competitive conditions for long-term contracts; innovations and *technological solutions*. Implementation of digital platforms for direct transactions with buyers; application of blockchain technologies for quality control and traceability of supplies; use of satellite monitoring for yield forecasting and export planning; *government support and international cooperation*. Attracting international investors and

financial organizations; supporting exporters through lending and risk insurance programs; lobbying for advantageous export conditions at the level of international organizations.
Partnership with international investors is a key tool for stabilizing grain exports during wartime, as it provides financing, reduces risks, and strengthens trust in Ukrainian products. Such models should be scaled up through government support, agricultural receipts, and active cooperation with donors. Below, we will consider examples of partners already involved in the industry.
1. International Finance Corporation (IFC) is a member of the World Bank Group. Invests in elevator infrastructure, logistics, grain terminals. Has financed over $200 million in agroprocessing and grain export projects. He invested in the Nibulon company, in particular in logistics along the Dnieper, which allows him to bypass sea blockades.
2. European Bank for Reconstruction and Development (EBRD). Provides soft loans and grants for the modernization of the agricultural sector, in particular in terms of digitalization and certification. Works with small and medium-sized agricultural producers. EBRD provides financing to Astarta-Kyiv for the development of digital platforms and modernization of grain elevators [6].
3. USAID (U.S. Agency for International Development). Provides grants for grain initiatives through the AGRI-Ukraine program. Supports equipment procurement, logistics, and implementation of quality standards. In 2023, USAID announced new programs to support grain warehouses and farmers to stabilize exports [7].
4. MIGA (Multilateral Investment Guarantee Agency) is another division of the World Bank. It provides guarantees against military and political risks to investors investing in Ukrainian agriculture. MIGA prepares guarantees for investors who want to finance infrastructure projects in the agricultural sector during wartime [8].
5. Cargill (USA) is a private multinational agricultural company. It has joint investments with Ukrainian companies in ports and terminals (for example, MV Cargo in the port of Pivdennyi). Purchases Ukrainian grain under long-term contracts [9].
We would also like to add that, as of 2025, all of the mentioned international organizations and companies remain active partners of the Ukrainian agricultural sector in 2025, adapting their activities to the current challenges of war and logistics restructuring.
Taking as a basis the current trends of the state's grain strategy, we emphasize that in 2021, grain production in Ukraine reached 84 million tons, which allowed the country to become one of the leading producers and exporters of grain crops on the world market. This became possible thanks to improved technologies for growing, processing, and storing grain, as well as the introduction of modern micro-irrigation systems and integrated plant protection systems.
After the start of a full-scale war in 2022, Ukrainian agricultural enterprises faced serious logistical problems due to the loss of access to Black Sea ports and shelling of river ports, which led to increased logistics costs and the need to reorient export routes.
Let's discuss the comparative effectiveness of alternative grain export routes from Ukraine. After the outbreak of full-scale war, traditional routes through major Black Sea ports (Odesa, Chornomorsk, Pivdennyi) became either limitedly accessible or completely blocked. In response, Ukraine began to actively develop alternative logistics routes (Table 2).

**Table 2.** Alternative logistics routes for Ukrainian grain exports

| Route | Advantages | Disadvantages/challenges |
|---|---|---|
| Danube ports (Izmail, Reni) | Direct access to the Black Sea, less dependence on large ports | Limited bandwidth, queues, high logistics costs |
| Railways to the EU | Access to ports in Poland, Romania, and the Baltic countries | Track divergence, shortage of wagons, bureaucratic barriers at the border |
| Road transport | Flexibility, the ability to deliver to any location | Limited cargo capacity, transportation costs, worn roads |
| River transport (Dnipro) | Environmental friendliness, restoration of inland waterways | Investments in infrastructure are needed, navigation is seasonal |

*Source: author's study.*

The relevance lies in the fact that comparative analysis makes it possible to optimize the state export strategy; determine where to direct investments (for example, in the expansion of Danube ports or modernization of the railway); assess the effectiveness of private-public partnerships in the development of new supply chains.

A comparison of alternative routes through ports and Danube land corridors with traditional Black Sea routes on three main criteria (cost, speed, reliability) demonstrates both advantages and individual challenges for grain exports.

Before the start of the full-scale war, Ukraine was one of the leading exporters of grain crops in the world. Export dynamics demonstrated stable growth, which was due to favorable climatic conditions, increased yields, and improved logistics routes.

In the 2020/21 marketing year, Spain, Italy, Greece, the Netherlands and Germany imported the most wheat among European countries. After the start of the full-scale war, the structure of Ukrainian wheat exports changed, and Poland and Romania also became major importers. At the same time, even in the 2022/23 marketing year, in wartime conditions, Spain's import volume remains more than four times higher than that of Poland or Romania. This indicates that Ukraine's key trading partners in the EU remain Western European countries, not its closest Central European neighbors. The dynamics of wheat exports to the EU countries is shown in Figure 1.

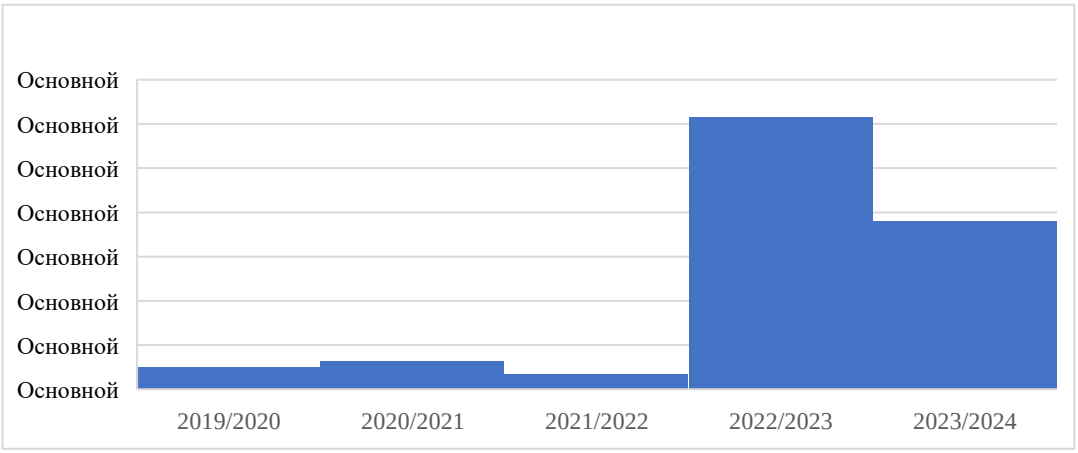


*Figure 1: Wheat exports to EU countries for five marketing years, million tons.*
*Source: European Commission's Directorate General for Agriculture and Rural Development [10].*

The tradition of Ukraine's grain export policy has not undergone any major fluctuations for a long time. Of course, specific years had certain deviations due to natural and economic factors, but with the beginning of the war in Ukraine, this trend requires special attention from us due to its unconventional changes compared to previous years. An analysis of the dynamics and deviations in sales of the main grain crops that are in greatest demand abroad is presented in Table 3.

**Table 3**. Ukrainian grain exports (thousand tons)

| Cereal names | Marketing Year | | Deviation |
|---|---|---|---|
| | 2023-2024 | 2024-2025 | |
| Wheat | 13504 | 12798 | -706 |
| Barley | 1957 | 2193 | +236 |
| Rye | 1,0 | 10,8 | +0,8 |
| Corn | 18447 | 16260 | -2187 |
| Wheat flour | 74,0 | 48,3 | -25,7 |
| Other flour | 4,1 | 8,9 | -4,8 |

*Source: Ministry of Agrarian Policy and Food of Ukraine. 03/24/2025 (data from the State Customs Service) [11].*

Therefore, we see that the trend for key grain items, in particular wheat, corn, and flour, is decreasing, while for less consumed crops, such as rye and barley, it is increasing.
Next, let's pay more attention to export indicators. Statistical data on grain exports in the current period are given in Table 4.

**Table 4.** Main indicators of Ukrainian grain exports during the war

| Parameter | Value |
|---|---|
| Food exports (July 2024) | 4.2 million tons (+100% by July 2023) |
| Grain exports (August 2024) | 1.26 million tons (+48.5% by August 2023) |
| Aggregate grain exports (July-August 2024) | 4.96 million tons (+58.9% by 2023) |

| | |
|---|---|
| Record monthly exports (January 2024) | 12 million tons (8.7 million by sea) |
| Ukraine's share in corn seed supplies to the EU | ~10% |

*Source: British agency Reuters [12].*

According to the British news agency and financial market data provider Reuters, during the war, Ukraine demonstrated significant success in grain exports, despite numerous challenges. For example, in July 2024, food exports exceeded 4.2 million tons, which is twice as much as in the same period last year. This growth was made possible by military achievements in the Black Sea region and the stabilization of maritime corridors. At the beginning of the 2024-2025 marketing year, Ukraine exported 5 million tons of grain and leguminous crops, which is 58.9% more than in the same period of the previous year. In particular, 2.27 million tons of wheat, 739 thousand tons of barley, and 1.932 million tons of corn were exported.

Despite the total volume of grain exports, small farmers in Ukraine suffer disproportionately high losses compared to large agroholdings, as we have already mentioned in our research. Note that, taking into account the aggregate data, the situation may significantly hide the following factors: reduced product margins; loss of access to logistics channels; inability to certify or digitize products (due to high cost/technical barriers); dependence on intermediaries who dictate prices in an unstable market. Let's try to understand these limitations in the context of our research vector in Table 5.

**Table 5.** Analysis of barriers to the development of small agricultural producers

| Aspect | Potential conclusions |
|---|---|
| Marketing strategies | Most small farms sell their crops immediately after harvest due to a lack of elevators and storage facilities. |
| Logistical access | Large companies have direct contracts with ports or traders, while small ones use the services of intermediaries. |
| Access to investments | Small farmers have virtually no access to international financing or grants without participating in cooperatives. |
| Digital inequality | There is a lack of knowledge, infrastructure, and funds to implement GPS, ERP, certification, and tracing systems. |

*Source: author's study.*

In times of war, small farms are forced to sell their crops immediately after harvest due to the threat of shelling, loss of infrastructure, and lack of grain elevators, which deprives them of flexibility in pricing. Broken logistics limit access to international markets, forcing companies to work through intermediaries on unfavourable terms. Price volatility and digital inequality make it difficult to adapt to new marketing formats, leaving most farmers in survival mode.

So, to summarize, to form sustainable agricultural export strategies in the context of war and post-war recovery, it is necessary to integrate the microeconomic level of analysis - in particular, to deeply investigate the marketing, logistical, and financial barriers faced by small farmers. This will avoid policy decisions that are based only on aggregate figures and do not take into account the deep structural vulnerabilities of the sector.

These indicators demonstrate the positive dynamics of Ukrainian grain exports, despite the military challenges. In response to changing conditions, Ukrainian farmers actively sought new sales markets and expanded the geography of exports. Among the promising areas, the Chinese market stands out, which is one of the largest consumers of grain in the world. China is among the five main importers of Ukrainian agricultural products, which opens up significant opportunities for increasing supplies [13].

Despite the positive aspects of the grain export market in Ukraine, which are undoubtedly the achievements of the authorities and farmers, risks and threats continue to exist. Grain exports from Ukraine currently face a number of serious risks, including the following:

*Military risks.* Attacks on ports and infrastructure, mining of the Black Sea, risks to crews and ship insurance.

*Logistical problems.* Limited alternative routes, loss of traditional Black Sea ports complicates transportation, and using land routes (via the EU) is significantly more expensive. Congestion at Danube ports and borders, and a large export flow are causing delays at border crossings. Limited railway capacity: switching to European track requires additional costs and time.

*Economic and trade restrictions.* Blocking Ukrainian grain in the EU, some countries (Poland, Hungary, Slovakia) periodically introduce restrictions on the import of Ukrainian agricultural products due to internal pressure from farmers. Increased logistics costs, due to the unstable situation, transportation and insurance costs have increased significantly. Dumping of prices for Ukrainian grain, due to difficult delivery conditions, Ukrainian grain is often sold cheaper, which reduces farmers' profits.

*Legal and political risks.* Changes in the policies of importing countries. New restrictions on Ukrainian grain are possible due to political or economic motives. Instability of agreements regarding the "grain corridor", lack of clear international guarantees of shipping safety.

*Climatic factors.* Drought and weather anomalies, which in turn affect yields and export volumes. Currently, Ukraine is experiencing a significant climate change, when winters have become not cold and snowy, but summers are hot. Grain storage problems, due to the destruction of infrastructure, grain storage facilities are overloaded or damaged.

Given these challenges, Ukrainian exporters are actively looking for new markets, developing alternative routes, and hoping for the support of international partners. In general, in the period 2022-2024, Ukrainian agricultural enterprises demonstrated flexibility and the ability to adapt to difficult conditions, developing and implementing effective marketing strategies for successful entry into global grain markets [3].

So, as we have already noted, Ukraine is one of the world's leading grain exporters, so effective marketing strategies are critical to strengthening its position in the international market. In the current environment of war and instability, marketing approaches must adapt to new challenges and opportunities. Ukraine's marketing strategies when entering global grain markets are aimed at diversifying exports, strengthening the Ukrainian grain brand, optimizing logistics, and using digital technologies. Flexible pricing policies, strategic partnerships, and international support play a key role in the stability of agricultural exports even in times of war [14].

The direction of Ukraine's entry into foreign markets focuses on expanding the geography of exports, reducing dependence on individual partners, and developing competitive industries. The strategy envisages integration into global economic processes through

international agreements, improving trade conditions and attracting investment. Important aspects are the modernization of production, compliance with international standards, digitalization and logistical simplification. Also, a significant role is played by state support for business, export crediting, and the development of innovations, which contributes to increasing Ukraine's presence in global markets [15].

Next, we will highlight and describe several key marketing strategies in our opinion:

*Diversification of sales markets.* Expanding the geography of exports - searching for new partners in Asia, the Middle East, Africa and Latin America; reducing dependence on traditional markets - balancing between the markets of the EU, China, Turkey and other key importers; adapting to importers' requirements - compliance with certification standards of different regions (for example, EU requirements for quality and environmental friendliness).

*Branding and positioning of Ukrainian grain.* Formation of Ukraine's image as a reliable supplier - communication campaigns in international markets, emphasizing the sustainability of the agricultural sector even during war; certification and standardization of products - compliance with international standards (ISO, HACCP, organic certification); implementation of the ESG approach - popularization of sustainable production, ecological methods of grain cultivation.

*Development of logistical capabilities and alternative routes.* Using the EU's "Solidarity Paths" - developing exports via rail and river routes bypassing blocked Black Sea ports; increasing exports via Danube ports - Izmail, Reni, Galati; cooperating with international partners to insure risks - searching for mechanisms to insure maritime transport across the Black Sea.

*Using digital technologies in marketing.* Online platforms for grain sales - creation of electronic exchanges, marketplaces for direct sales of agricultural products; Big Data and market analytics - use of analytical tools to forecast demand and optimize pricing policy; automation of contracts via blockchain - implementation of smart contracts for transparency of trade transactions.

*Flexible pricing strategy and competitiveness.* Adapting to global price fluctuations – using hedging to minimize risks; optimizing costs in production and logistics – increasing transportation efficiency, attracting international investors to develop port infrastructure; introducing partnership programs – long-term contracts with international traders and spot transactions on favorable terms.

*Lobbying interests at the international level.* Cooperation with international organizations - WTO, FAO, EU, UN to protect the interests of the Ukrainian agricultural sector; active participation in negotiations on trade agreements - reducing barriers for Ukrainian products on the global market; combating dumping accusations - upholding fair trade conditions in relations with neighboring countries.

We will separately highlight the issue of online platforms and blockchain technologies for optimizing grain exports. Cybersecurity risks and lack of technological readiness are significant deterrents to the implementation of online platforms, big data analytics, and blockchain solutions in Ukrainian agricultural grain exports. Most small and medium-sized farms have limited access to digital infrastructure and do not use modern ERP systems, and the level of digital literacy among farmers remains low. This makes it difficult to even automate basic accounting and logistics, let alone integrate more complex technologies like blockchain or AI analytics.

In wartime conditions, the risks of cyberattacks increase - both on state platforms and on logistics chains (for example, export control systems through "Diya" or "Shlyakh"). The lack of secure communication channels, as well as the absence of standardized data exchange protocols between market participants, make such systems vulnerable.
Let us consider the resilience of agricultural enterprises to digital threats in today's conditions in Table 6.

**Table 6.** Current resilience of Ukrainian agricultural enterprises to digital threats

| Indicator | Status |
|---|---|
| Cybersecurity level | Average or low among small and medium-sized farms. |
| Implementation of secure systems | Mostly large agricultural holdings use cloud CRM/ERP with built-in protective layers. |
| Cyber threat awareness | Insufficient, especially among regional farmers without technical support or training. |
| Availability of IT security policies | Most small and medium-sized businesses lack formalized information protection or backup protocols. |

*Source [16].*

From the data in the table, we see significant cyber vulnerability of the small and medium-sized agricultural sector in Ukraine. The level of cyber protection remains insufficient, due to both low awareness of cyber threats and the lack of IT strategies and formalized security policies. While large agricultural holdings are actively implementing secure CRM/ERP systems, small farms remain largely without technical support and vulnerable to abuse or attacks. Such a digital divide increases the risks when implementing innovations, in particular blockchain or online trading, and requires targeted measures from the state and donors.
In Table 7, we will conduct a brief analysis of increasing the digital resilience of Ukrainian agricultural producers to cyber threats, with a focus on small and medium-sized businesses (SMB).

**Table 7.** Increasing the cyber resilience of Ukraine's agricultural sector

| Problem | Consequences | Recommendations | Responsible parties |
|---|---|---|---|
| Low level of cybersecurity in SMB | Data leaks, fraud, loss of contracts | Implement educational programs on basic cyber hygiene for agricultural producers | Ministry of Agrarian Policy, State Special Communications Service, donors (USAID, GIZ) |
| Lack of information security policies | Unsecured online platforms, account hacking | Develop templates for cyber policies and security protocols for SMEs | Farmers' associations, agricultural platforms, specialized IT companies |
| Insufficient access control to blockchain | Data manipulation, contract cancellation | Standardize user authentication (2FA, verification) | Platform developers, Diya/Mintsyfra |

| | | | |
|---|---|---|---|
| and Big Data services | | | |
| Lack of data backup | Complete data loss in the event of an attack or failure | Provide instructions and software for backup infrastructure | IT companies, government digital projects |
| Financial barriers to implementing protection | Dependence on intermediaries, vulnerability | Provide subsidies for cyber defense within the framework of state programs to support agro-SMEs | Ministry of Finance, Ministry of Agrarian Policy, donor funds |

*Source: author's study.*

Analysis of the table shows that the most vulnerable to cyber threats remain small and medium-sized agricultural producers, who have neither professional technical support nor adequate funding to implement basic digital protection tools. In the context of increasing digitalization – through the introduction of online platforms, GPS monitoring, blockchain, and Big Data – it is the lack of a systemic approach to security that poses a serious threat to agricultural exports in general.

Therefore, without cyber protection, the digital transformation of the agricultural sector remains incomplete: most farms do not have cyber hygiene policies, which creates risks of loss of data, contracts, and trust. Effective implementation of IT solutions requires targeted support, simplified tools, and a government cyber resilience policy.

We would like to highlight the standardization strategy as a separate opinion. Standardization is an important factor in Ukraine's successful integration into world grain markets, as compliance with international requirements contributes to increased competitiveness and expanded export opportunities. The primary task is to harmonize Ukrainian standards with international norms, such as ISO, Codex Alimentarius, and the requirements of the EU, the USA, and China. This will ensure that product quality meets global standards and minimize technical barriers to trade. An equally important aspect is the introduction of grain certification in accordance with international requirements for safety, environmental friendliness, and organic production. The use of advanced methods of quality control and traceability of grain origin will help strengthen the trust of foreign buyers and simplify customs procedures. In addition, standardization includes the adaptation of technological processes, the introduction of modern laboratory research and digital product quality monitoring systems [17].

We believe that Ukraine should also strengthen cooperation with international regulators and expert organizations to ensure prompt updating of standards in line with changes in the global market. The introduction of uniform standards will help reduce logistics costs, facilitate entry into new markets, and increase trust in Ukrainian grain in the international arena [18].

It should be noted that today it is already known that the Ukrainian Grain Association (UGA) supports the agreement between the US and Ukraine on the restoration of free navigation in the Black Sea. Since the start of the full-scale invasion, the UGA has called on the international community to ensure free passage of ships in the international waters of the Black Sea to guarantee a stable supply of food to countries in need. The functioning of the Ukrainian maritime corridor has significantly improved food exports, in particular

grain, from domestic ports. The restoration of free navigation in the international waters of the Black Sea will help reduce risks for shipowners, which in turn will lead to a decrease in freight and insurance costs for vessels and cargo. This will help Ukrainian producers receive a more favorable price for their products, and consumers around the world will be able to purchase grain at a more affordable price.

At the same time, the UGA warns against the implementation of unfounded decisions or mechanisms that may complicate or slow down navigation in the Black Sea. Additional restrictions and barriers not only contradict the principle of free navigation, but also could destabilize global food security, once again turning food into a tool of pressure.

Further characterizing the direction of our research, we will pay attention to the pricing policy for Ukrainian grain on world markets. At the beginning of the new year 2025, the grain market is showing variable dynamics, prices are fluctuating, industry analysts report, citing data from the Dutch portal Nieuwe Oogst dated January 2. At the same time, the market situation was difficult at the end of last year due to significant pressure. On the Paris futures market, a ton of wheat for March delivery was valued at 238 euros on January 2. This indicates that the year began with a price level that is 17 euros higher than the same period last year [19].

Analysts note that the mood in the market has changed compared to last year. The market was very pessimistic then: the Black Sea countries had large quantities of wheat, which dominated world trade. As a result, competition for large-volume exports led to lower prices. The lowest levels were reached in early March, when futures quotes fell below €190 per tonne. By early 2024, the price was already higher at €221 per tonne.

Over the past three years, world prices for Ukrainian grain have experienced significant fluctuations due to various geopolitical and economic factors. The dynamics of this process are graphically depicted in Figure 2.

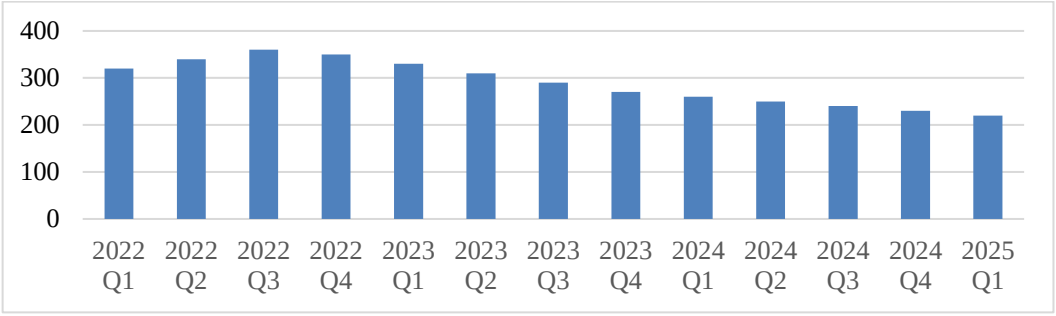


*Figure 2. Dynamics of world prices for Ukrainian grain (2022-2025) Sources: FAO (Food and Agriculture Organization of the United Nations); Ministry of Agrarian Policy and Food of Ukraine (Ministry of Agrarian Policy) [11].*

For comparison, we would like to emphasize that as of 2022, high grain prices were caused by an increase in production costs, especially due to the increase in the price of mineral fertilizers. In addition, limited rainfall in the fall affected yields, further pushing up prices.

In June 2023, the destruction of the Kakhovka hydroelectric power plant led to a 3.8% increase in wheat prices. July 2023 marks the end of the "grain agreement", which caused a rise in world prices for grains and oilseeds by more than 15% and negatively affected

countries dependent on food imports. In December 2024, the FAO Cereal Price Index was 15.4% lower than the 2023 average, reflecting a general decline in food prices. As of March 2025, wheat prices had reached their lowest level since August 2020, driven by peaceful negotiations between major exporters and record harvests [20].

In general, the dynamics of world prices for Ukrainian grain over the past three years have been marked by periods of both growth and decline, depending on geopolitical events, weather conditions, and changes in global demand and supply [21].

Summing up the topic of our research, taking into account current challenges, we would like to emphasize that the prospects for grain exports from Ukraine in 2025 are quite relevant. In our opinion, several factors may contribute to this:

*Infrastructure restoration.* The government plans to attract investments to modernize ports, increase the capacity of railway crossings, and build new grain elevators in border regions. *Expansion of sales markets.* Ukrainian farmers are actively looking for new markets in Africa and Asia to reduce dependence on traditional destinations. *Support of international partners.* International organizations, including the UN, are expected to continue supporting exports through humanitarian programs. *Rising grain prices.* Global demand for wheat has always been and remains high, which in turn has a positive impact on export revenues.

Despite the difficulties, Ukraine remains a significant player in the global grain market. Thanks to adaptation to new conditions and international support, a gradual increase in export volumes and expansion of the geography of supplies is expected in 2025. As for the prospects for Ukrainian grain exports in 2025, everything will depend on a number of factors, including yield, infrastructure capabilities, regulatory changes, and the geopolitical situation. Let's highlight a few of them.

*Production and yield.* Ukraine's wheat harvest is expected to increase to 25 million tons in 2025 compared to 22 million in 2024, mainly due to the expansion of sown areas to 5 million hectares.

*Export volumes and restrictions.* Grain exports are projected to decline to 40.3 million tons in the 2024/2025 marketing year. In particular, the limit for wheat exports is set at 16.2 million tons [22].

*Regulatory changes.* In December 2024, Ukraine introduced a system of minimum export prices for key agricultural commodities, which prohibits exports at prices lower than those set by the Ministry of Agrarian Policy. However, agricultural associations are calling on the government to suspend these changes, as they could hinder the conclusion of export contracts.

*Logistics and infrastructure.* The war significantly affected Ukraine's export infrastructure. A significant portion of exports is carried out through Romanian ports, particularly Constanta. Possible political changes in Romania may affect the availability of this route.

*Financial losses and investments.* According to estimates by the Kyiv School of Economics, indirect losses to Ukraine's agricultural sector due to the war could reach $83 billion by the end of 2025. Restoration and modernization of infrastructure, as well as attracting investment, are critically important for stabilizing and developing exports [12,23].

Despite the challenges caused primarily by the war, which caused enormous destruction to economic capacity, Ukraine has the potential to maintain and even increase grain exports. To do this, it is necessary to adapt to new market conditions, improve infrastructure, and ensure the stability of the regulatory environment [24].

Ukraine's demonstration of resilience on the global grain market is obvious. Adaptation to new realities and management of export directions is taking place. The growth of exports to the EU indicates the flexibility of Ukrainian farmers and their ability to find new markets in the face of global challenges [25]. As of January 31, 2025, Ukraine continues to hold the position of the leading exporter of grains on international markets. A statistical analysis of Ukrainian grain exports is presented in Figure 3.

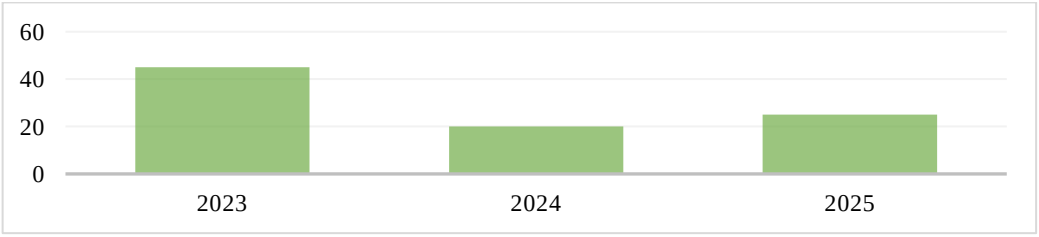


*Figure 3. Grain export volumes (million tons)*
*Source: Agricultural News of Ukraine and the World [26].*

Let's do a quick analysis of this chart. In 2024, grain exports decreased significantly compared to 2023. The drop is more than 50%. 2025 is marked by an increase in exports compared to 2024, but still below the level of 2023. There may be several reasons for this dynamics: the negative impact of weather conditions, restrictions on exports due to political and economic factors. And although the rise in 2025 indicates improved conditions for exports, the level remains lower than in 2023.

No less interesting will be the analysis of grain exports by crop. The dynamics of sales indicators in this direction also has its own fluctuating tendency if compared by year. But we would like to note that the general trend of grain crops, as its name suggests, will not undergo any radical changes. The sequential structure of grain sales up to and including 2025 is shown in Figure 4.

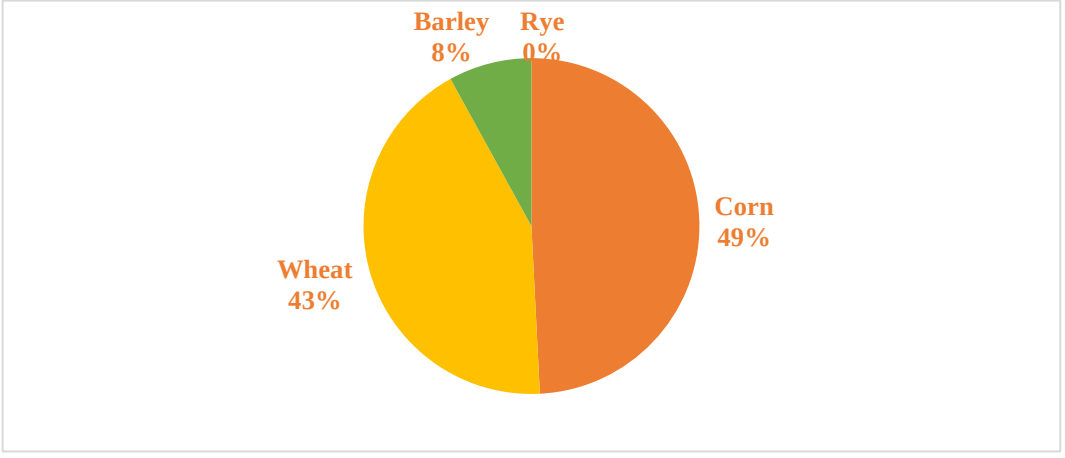


*Figure 4. Grain export structure (2025)*
*Source: Agricultural News of Ukraine and the World [26].*

As we can see, Ukrainian grain exports in 2025 consist mainly of corn and wheat. Barley plays a secondary role, and rye is practically not exported. This trend is usually driven by global market demand, climatic conditions, and domestic agricultural policy.
It is advisable to pay attention to the analysis of the profit received by Ukraine from the sale of the above-mentioned key exported grain crops. The analysis of the income received is presented in Figure 5.

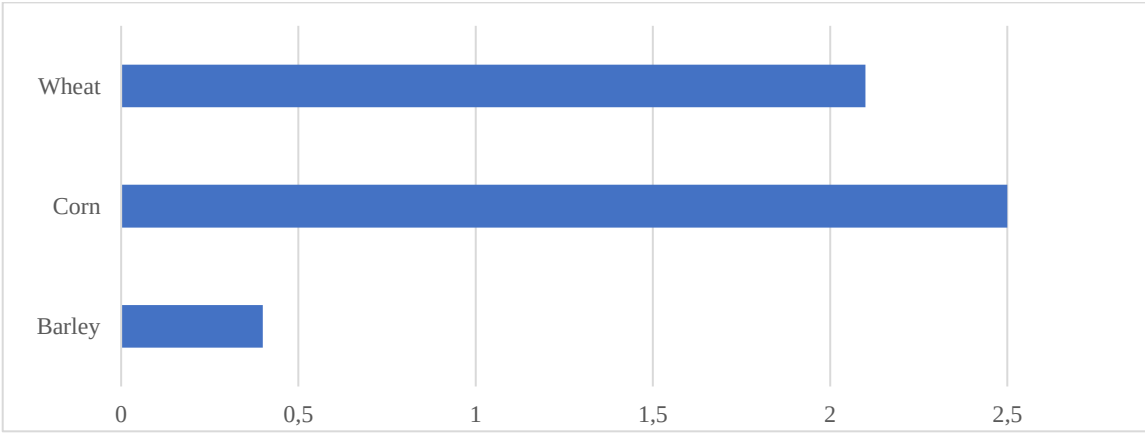


*Figure 5. Revenue from grain exports (billion USD)*
*Source: Agricultural News of Ukraine and the World [26].*

Analyzing the graph, we see that the world demand for Ukrainian grains has been formed for a long time. Accordingly, Ukraine, acting in this case as a significant exporter, can clearly plan the results of its positions. The data we have displayed in the proposed histogram indicate a higher demand for corn and wheat on the world market compared to barley [27].
One of the effective methods of economic forecasting for analyzing the entry of Ukrainian grain into world markets is econometric modeling. VAR (Vector Autoregression) is a vector autoregression model that allows us to analyze the interdependence between several economic indicators over time. This approach will allow us to predict how the situation with Ukrainian grain exports will change in the near future.
Let's build a VAR model to forecast Ukrainian grain exports for 2025 in Figure 6. The forecast we propose reflects changes in exports every two months. The forecast shows a gradual increase in exports throughout the year.

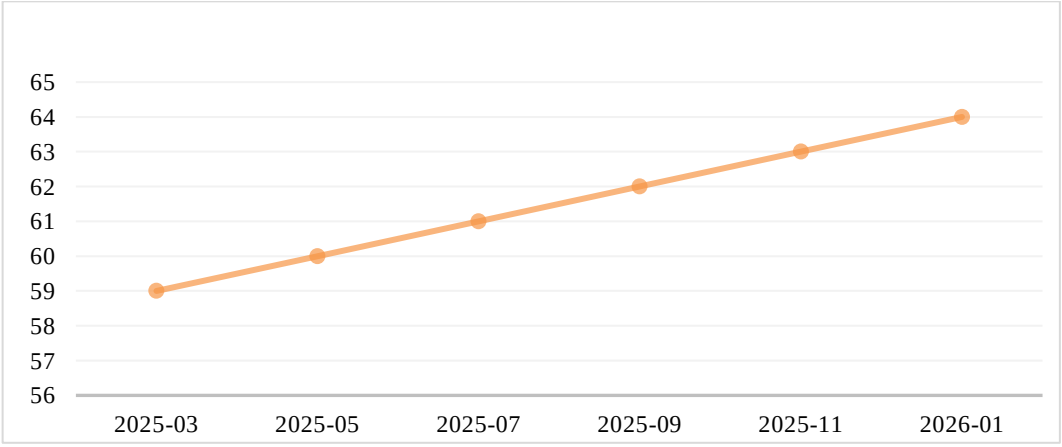


*Figure 6. Forecast of Ukrainian grain exports in 2025 million dollars*
*Source: USDA (United States Department of Agriculture) (www.usda.gov) – forecasts for the global grain market [28].*

Thus, Ukraine demonstrates positive dynamics in grain exports, increasing the volume of supplies and income from them. The growth of wheat and barley exports, as well as stable indicators for corn, indicate the resilience of the agricultural sector and its ability to adapt to the challenges of the international market. Continuing the topic of forecasting Ukrainian grain exports to world markets, we will conduct a SWOT analysis in Table 8.

**Table 8:** SWOT analysis of the Ukrainian grain market (as of 2025)

| Strong points | The weak points |
|---|---|
| *High yields and fertile soils* – Ukraine remains one of the largest grain producers in the world. *Favorable geographical location* – proximity to major sales markets (EU, Middle East, Africa). *Export diversification* – searching for new markets (Asia, Latin America) to reduce dependence on individual countries. *State programs to support the agricultural sector* - stimulating exports and attracting investment. *Development of technologies and agro-innovations* – improving the quality of grains through precision agriculture and genetic research. | *Dependence on world grain prices means* high market volatility and instability of farmers' profits. *Logistical problems* – lack of port capacity, railway and road infrastructure. *Financial vulnerability of farmers* – limited access to cheap credit and investment in small and medium-sized farms. *Climatic risks* - droughts, natural disasters affect yields. |
| Opportunities | Threats |

| | |
|---|---|
| *Expanding exports to Asia and Africa* – increasing demand for grains in these regions.<br>*Investments in logistics and ports* – modernization of export infrastructure to increase transportation volumes.<br>*Increasing the share of processed products* – entering the market with flour, feed, and other value-added products.<br>*Signing new trade agreements* – reducing customs barriers for exports to the EU and Middle East.<br>*Development of green energy* - use of agricultural waste for the production of biogas and biofuel. | *Political instability and war* are risks associated with military action and sanctions.<br>*Global competition* – increased grain exports from Canada, the USA, and Brazil.<br>*Environmental restrictions* – possible new regulations on the use of pesticides and fertilizers, which may affect the cost of production.<br>*High logistics costs* – instability of tariffs for transportation across the Black Sea and increased insurance rates.<br>*Financial crises* – a possible global economic downturn, which could reduce demand for grain. |

*Source: author's work.*

Therefore, analyzing the data of our SWOT analysis, we can draw confident conclusions that Ukraine has every chance of remaining a key player in the global grain market in 2025 and beyond. However, it is necessary to actively develop logistics, processing, and the search for new markets to reduce risks and strengthen competitive advantages.

As we have repeatedly stated, the war in Ukraine has significantly affected the global grain market, creating risks of food shortages and rising prices. To stabilize the situation, we want to offer a comprehensive approach that will include short-term and long-term measures.

**Operational (urgent) measures.** These actions are aimed at preventing acute food shortages and stabilizing supplies.

*Alternative grain export routes.* Expansion of export corridors through Danube ports, railways and roads to the EU, increasing transshipment capacities in neighboring countries (Poland, Romania, Lithuania) for the transit of Ukrainian grain, searching for alternative sea routes through the Baltic and Mediterranean Seas.

*Humanitarian food programs.* Continuation of UN programs (World Food Programme) for the supply of Ukrainian grain to poor countries in Africa and Asia, the formation of strategic grain reserves in countries that depend on Ukrainian exports, the creation of food reserves within international organizations (FAO, WTO, EU).

*Price control and state support for farmers.* Subsidies for Ukrainian farmers to support production in wartime conditions, control of pricing policy in the domestic market of Ukraine to prevent sharp price jumps, lowering export barriers for grains in partner countries.

**Long-term measures (2-5 years).** Creating a sustainable and independent global food system.

*Reducing the world's dependence on a single exporter.* Development of agriculture in developing countries (Africa, Asia), increased grain production in the EU, USA, Canada, Brazil, expansion of global grain reserves to stabilize the market.

*Restoration of the agricultural sector.* Investments in the restoration of agricultural lands, clearing of territories, demining of fields, modernization of agricultural infrastructure, and the return of workers to the industry.

*Use of innovation and technology.* Development of climate-resilient grain varieties, use of precision farming technologies to increase efficiency, automation and robotization of production to reduce human losses due to war.

## 5. Conclusion

Ensuring Ukraine's sustainable access to global grain markets is a strategically important task. This not only ensures the economic stability of the country, but also makes a significant contribution to global food security. This process is not only an economic issue, but also a factor in global stability. Optimization of export logistics, expansion of markets, and effective state support can significantly strengthen Ukraine's position in the international market and contribute to the stabilization of the global food system.

The proposed marketing strategies are undoubtedly primarily intended for rapid response to a wartime crisis. They help ensure the operational visibility of Ukrainian grain on the market, provide a signal of supplier reliability in times of uncertainty, and attract new partners through a single brand and active communication. At the same time, these tools have all the prerequisites to become the foundation of long-term sustainability.

Firstly, the single national brand "Ukraine Grain" with a clear corporate style creates recognition in global markets, which can be maintained even after the end of the war. Secondly, market diversification (access to Asia, Africa, Latin America) reduces dependence on a few traditional buyers and creates sustainable trade corridors that will operate even in peacetime. Third, emphasizing quality and compliance with international environmental standards (ESG) gives an advantage in markets where demand for "green" products will only grow, so investments in certification and eco-labeling will pay off in the long term.

As for climate change adaptation and environmental sustainability, incorporating them into systemic marketing and logistics strategies will allow the Ukrainian agricultural sector not only to respond quickly to military challenges, but also to lay a solid foundation for long-term stability. First, implementing sustainable farming practices (mixed crop rotations, minimum tillage, cover crops) reduces erosion and maintains fertility, ensuring high grain quality even as temperatures rise and precipitation fluctuates. Secondly, the development of agroforestry and the creation of buffer zones along the water corridors of the Danube and Dnieper rivers strengthens protection against floods and droughts, while increasing biodiversity and the attractiveness of the Ukraine Grain brand for markets that value organic products. Third, digital platforms and big data analytics, adapted to climate scenarios, will allow farmers to predict stressful periods and optimize water and fertilizer consumption, increasing profitability even during dry growing seasons. Finally, promotion in international markets with a clear environmental certificate (Organic, Regenerative, Carbon Smart) will gain added value in EU and Asian countries, where consumers are willing to pay a premium for products grown with a minimal carbon footprint.

To effectively support Ukraine's entry into global grain markets, systemic marketing strategies are needed at the state and corporate levels, in particular, such strategies include the formation of a single brand for the country as a grain supplier; entering new or expanding share in promising markets; demonstrating quality and safety; strengthening

cooperation with governments, corporations and associations; positioning Ukraine as a responsible exporter; demonstrating powerful logistics, ports, and elevators.
Logistics is a critically important component that affects the speed, cost, and reliability of exports. We offer specific logistics proposals that will contribute to the successful entry of Ukrainian agricultural enterprises into global grain markets. Diversification of export routes to minimize risks associated with port blockades or military threats. Investing in logistics infrastructure to reduce dependence on limited logistics points. State support and international cooperation to attract financing and political support for logistics projects to make Ukrainian grain more attractive through ease of delivery.
Regarding the pricing policy of Ukraine's strategy for entering international markets, we propose the following series of measures. Using the principle of flexible pricing depending on the market: for example, a higher price for the EU (due to quality requirements), a lower one for African or Asian countries. Strategy for new markets: at the initial stage of entering a new market - the price is lower than the average market price to attract traders and gain volume, and then a gradual increase in price along with quality and service. Volume discount system. Transparency of pricing: separate grain price, logistics, insurance. Therefore, to successfully enter global grain markets, Ukraine must implement a comprehensive strategy that combines state support, modernization of logistics infrastructure, effective marketing, flexible pricing, and international cooperation in order to establish itself as a reliable, stable, and competitive grain supplier at the global level.

## References

1. Maslak A., Kutsenko I. GRAIN MARKET DEVELOPMENT IN UKRAINE. 2015. BALTIC JOURNAL OF ECONOMIC RESEARCH 1 (2), pp.77-82.
2. Audesh K. Paswan, Charles Blankson, and Francisco Guzman. Relationalism in Marketing Channels and Marketing Strategy. Department of Marketing and Logistics, College of Business, University of North Texas, Denton, Texas, USA. https://doi.org/10.1108/03090561111107212
3. Antonio Miguel Martins, 2024. "Short-Term Market Impact of the Black Sea Grain Initiative on Four Grain Markets," Journal of Futures Markets, John Wiley & Sons, Ltd., vol. 44 (4), pages 619-630, April. https://doi.org/10.1002/fut.22481
4. Institute of Economics and Forecasting of the National Academy of Sciences of Ukraine. (2023). Digitalization of the Agricultural Sector: Challenges, Opportunities and Development Strategy. Kyiv: National Academy of Sciences of Ukraine. https://ief.org.ua
5. Roman Lohosha, Vitalii Palamarchuk, Vadim Krychkovskyi, Ihor Belkin. An advanced European overview of the bioenergy efficiency of using digestate from biogas plants when growing agricultural crops. Polityka Energetyczna – Energy Policy Journal. 2024. Vol 27. Issue 1. P. 5-26. https://doi.org/10.33223/epj/170758
6. European Bank for Reconstruction and Development (EBRD). (2023). "Astarta-Kyiv Investment in Digital Platforms and Modernisation of Grain Processing Facilities." European Bank for Reconstruction and Development. https://www.ebrd.com
7. USAID (U.S. Agency for International Development). (2023). "AGRI-Ukraine Program: Supporting Ukraine's Grain Export through Transport Solutions." USAID. https://www.usaid.gov
8. MIGA (Multilateral Investment Guarantee Agency). (2023). "MIGA Guarantees in Ukraine's Agricultural Sector: Protecting Investments Amid Geopolitical Risks." MIGA. https://www.miga.org
9. Cargill. (2021). "Cargill's Investment in Pivdennyi Port Terminal: Ensuring Ukraine's Grain Export Capacity." Cargill. https://www.cargill.com
10. European Commission, Directorate-General for Agriculture and Rural Development. (2025). Official website. Retrieved from https://agriculture.ec.europa.eu [Accessed 4 April 2025].

11. Ministry of Agrarian Policy and Food of Ukraine. (2025). Official website. Retrieved from https://minagro.gov.ua [Accessed on: April 4, 2025].
12. Reuters. Ukraine introduces minimum export prices for major agricultural goods [Electronic resource] // Reuters. – 02.12.2024. – Access mode: https://www.reuters.com/markets/commodities/ukraine-introduces-minimum-export-prices-major-agricultural-goods-2024-12-02/
13. Said Sami and Sutavan Chirapanda. International Marketing Strategy in Emerging Exporting Companies. Journal of International Marketing. Vol. 27, No. 1 (March 2019), pp. 20-37. https://doi.org/10.1177/1069031X18812731
14. Stanley F. Slater, G. Thomas M. Hult, Eric M. Olson Factors affecting the relative importance of marketing strategy creativity and the effectiveness of marketing strategy implementation. Industrial Marketing Management, Volume 39, Issue 4, May 2010, pages 551-559. https://doi.org/10.1016/j.indmarman.2008.03.007
15. Tomashuk I., Tymchenko O., Zakharova T. (2024). AGRICULTURAL ENTERPRISE DEVELOPMENT STRATEGY AND ITS EFFICIENCY IN MODERN ECONOMIC CONDITIONS. BALTIC JOURNAL OF ECONOMIC RESEARCH. Volume 10 Issue 2 Page 265-281 https://doi.org/10.30525/2256-0742/2024-10-2-265-281
16. USAID (2023). Cybersecurity and Digital Resilience in Ukraine's Agriculture Sector. U.S. Agency for International Development. https://www.usaid.gov/ukraine/news-information
17. Pronko L., Furman I., Kucher A., Gontaruk Yu. (2020). Formation of a state support program for agricultural producers in Ukraine taking into account world experience. European Journal of Sustainable Development, 9(1), 364. https://doi.org/10.14207/ejsd.2020.v9n1p364
18. Solberg, K.A. and Durrieu, F. (2023), "Patterns of International Marketing Strategy", Journal of Business & Industrial Marketing, Vol. 38 No. 7, pp. 1532-1544. https://doi.org/10.1108/JBIM-02-2022-0091
19. Ignatyuk A., Goncharuk I., Yakymchuk B. (2020). MODEL OF OPTIMIZATION OF PRICES FOR GOODS AND SERVICES OF PLATFORMS IN DIFFERENT MARKETS. Baltic Journal of Economic Research, 6(5), 89-95. https://doi.org/10.30525/2256-0742/2020-6-5-89-95
20. Hamulchuk M., Cherevik D., Makarchuk O., Kuts T., Volyaks L. (2023). Integration of Ukrainian grain markets with foreign markets during the Russian invasion of Ukraine. Problems of Agricultural Economics / Problems of Agricultural Economics, 377(4), 1–25. https://doi.org/10.30858/zer/177396
21. Pronko L., Kolesnyk T., Samborska O. (2021). The essence and concept of enterprise capitalization, its types and methods of assessment. European Journal of Sustainable Development, 10(1), 551. https://doi.org/10.14207/ejsd.2021.v10n1p551
22. European Business Association. Wheat export volumes for the 2024-2025 marketing year approved [Electronic resource] // Ukr.net. – 2024. – Access mode: https://www.ukr.net/news/details/economics/108640161.html.
23. Kyiv School of Economics. (2025). Official website. Retrieved from https://kse.ua [Accessed on April 4, 2025].
24. Kozlovsky S., Yusuf A., Butenko V., Kulinich T., Bohdanyuk O., Nikolenko L., Lavrov R. (2024). The impact of the world grain market on the prevalence of malnutrition during the war in Ukraine. Problemy Ekorozwoju, 19(1), 31–42. https://doi.org/10.35784/preko.5748
25. Ukrainian National News (UNN), Mind [Electronic resource]. – Access mode: https://www.unn.com.ua, https://mind.ua – Access date: 02.04.2025.
26. Agrarian News of Ukraine and the World [Electronic resource]. – Access mode: https://www.agroportal.ua – Access date: 02.04.2025.
27. State Statistics Service of Ukraine. (2025). Official website. Retrieved from https://ukrstat.gov.ua [Accessed on: 4 April 2025].
28. USDA (United States Department of Agriculture) (www.usda.gov) – forecasts for the global grain market.