

О. Є. Шандрівська, І. М. Романус, В. А. Шандрівський  
Національний університет “Львівська політехніка”

## АНАЛІЗ ПРОБЛЕМ РОЗВИТКУ РИНКУ ЗЕРНА В УКРАЇНІ НА ЗАСАДАХ ЛОГІСТИКИ

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Комплексно проаналізовано кон'юнктуру ринку зернових в Україні, проблеми функціонування та розвитку зернової галузі. Висвітлено чинники впливу на кон'юнктуру ринку зернових під час формування експорту зерна порівняно з світовим лідером. До розгляду взято такі чинники: основний ціноутворювальний чинник, принцип формування ціни, рівень цін, наявність експортного мита, структура собівартості, специфіка виробництва та споживання, особливості логістики. Систематизовані проблеми зернової галузі, причини їх виникнення та способи розв'язання на засадах логістики. Проблеми ідентифіковано за такими напрямками: проблеми із зберіганням та транспортуванням зерна різними видами транспорту, інформаційне та технологічне забезпечення транспортно-складської вантажопереробки, контроль якості, бар'єри входу та функціонування, неефективне логістичне управління сільськогосподарськими компаніями тощо. Зроблено висновки щодо перспектив розвитку, основними з яких є розвиток логістичної інфраструктури, вдосконалення системи контролю якості відповідно до міжнародних вимог та оновлення основних фондів підприємств агропромислового комплексу.

**Ключові слова:** кон'юнктура ринку зернових, логістика ринку зернових, агропромисловий комплекс, проблеми розвитку аграрних підприємств.

O. Shandrivska, I. Romanus, V. Shandrivskiy  
Lviv National Polytechnic University

## ANALYSIS OF THE GRAIN MARKET PROBLEMS IN UKRAINE BASED ON LOGISTICS

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There is made a comprehensive analysis of market conjuncture of grain in Ukraine, analyzed the problems of functioning and development of the grain industry on the work. There are highlighted factors of influence on the market conjuncture of grain during the formation of grain exports in comparison with the world leader. Before consideration are taken: the main pricing factor, the principle of pricing, cost structure availability of export duties, specificity of logistics, the structure of production and consumption e.g. There are systematized grain industry issues, their causes and way of resolving. Problems identified in the following areas: problems with the storage and transportation of grain by different modes of transport, information and technological support of transportation and warehousing cargo handling, quality control, entry barriers and functioning, inefficient logistics management agricultural companies etc. Problems are grouped by such the factors: problems as regards storing and transporting grain, quality control problems and another environmental problems. We have concluded regarding the perspective of development, the main of which are development of logistics infrastructure, improving the quality control system in accordance with international requirements and renovation of fixed assets of enterprises of agricultural complex.

**Key words:** market conjuncture of grain, logistics of grain market, agricultural complex, problems of development of agricultural enterprises.

**Statement of the problem.** Logistics due to its interdisciplinary character finds a place in many sectors of economy, including increasing its importance in the agribusiness. An important part of the agroindustrial complex (AIC) is a market of grain, which is the main source of the country food providing. Grain is extremely profitable commodity for export abroad due to possibility of its long-term storage and high profitability. Opening new terminals, prevalence of the capacity of transshipment under the grain supply, expansion of acreage despite the crisis, export quotas and reducing the growth on the world prices for grain, indicate that the grain industry in Ukraine has a great potential for economic development. However, the last one is not used fully. In particular, this is due to lack of effective logistics management, deficient provision of vehicles, storage facilities e.g. Loss of grain during the inefficient logistics can reach more than 15 % of annual crop and can be expressed by the losses in mln tons [1]. Therefore, we must increase the level efficiency of logistics and generate recommendations for development of grain industry in Ukraine.

**Analysis of recent research and publications.** The problems of development of grain agriculture of Ukraine are learned in the publications of V. Zhygadlo, G. Pidlisetskoho, R. Sabluka and others ones. Strategic management and marketing of agricultural enterprises learned V. Andriychuka, O. Bodnar, L. Voloschenko, L. Kozak and others ones. The problems in the agricultural logistics were learned by N. Vasilieva, T. Kosareva, T. Oliynyk, I. Smirnova and others ones.

**Goals of the article.** The aim is to study the problems, current state of the grain industry and to make the proposals as regards improve its functioning based on logistics.

**The main material of research.** Practical implementation of logistics in the grain market is confirmed by the following arguments.

According to US Department of Agriculture (USDA), the world's grain production is 1,98 billion tons, 63,8 million. Tons or 3,1 % of which is Ukrainian grain [2]. The peculiarity of Ukrainian grain market is that export prevails import.

This phenomenon is typical for a limited number of countries. According to estimates of national experts and USDA forecasted crop of grain and leguminous in Ukraine in 2015/2016 marketing year will amount to 59,830,000 tons. In 2016/2017 m. y. – 58 millions 800 thousand tons. It is decided to export 34.6 million. tons of grain from Ukraine to the Middle East countries, Africa, China, and in the future in the Arab countries [3].

Approaching domestic prices to the world ones is the main condition of deep integration of Ukrainian grain market into the global trading space. Ukraine's accession to the WTO, the Association Agreement with the EU, the progress of the global financial crisis of 2008-2009 and the second part of 2014 positive outlook of capitalization and forecasted increasing to demand on the world grain market enable Ukrainian grain market either be influenced by the market conditions or the influence it too.

Key Ukraine's position on the world grain market are fixed by unrealized production potential, which is defined in terms of productivity of major crops, which are almost twice lower in Ukraine than in leading countries. By the way the key manufacturing resource – land in Ukraine is characterized by one of the best indexes in the world. These facts confirm long-term forecasts FAO (Food and Agriculture Organization), according to which by 2023 the world's wheat production will increase to 778,100,000 tons [2].

However, wheat production in Ukraine, according to experts of FAO, for the same period will increase by 26,29 %, while production of coarse cereals – by 24,1 %. That will cause consolidation of state positions on the world's grain market. This factor continues to dominate the price situation on the grain market. Today it is marked the approach of world prices based on crops to the low level for the period from 2012 to 2014 [2].

It is known that among the subjects of the grain market are distinguished the following groups: subjects of grain producing, grain storage subjects, subjects of state regulation of the grain market, the subjects of trade, financial entities and settlement service agents transport and logistics software, other entities [4, p. 145]. The entities grain productions are: owners and tenants of land, farmers, households and others ones. The group of storage units includes grain stocks (elevators, grain base, the flour, the combined

company), another entities involved in the storage of cereals. Group of state regulation of grain market includes: Cabinet of Ministers of Ukraine, the Agrarian Fund, Agrarian Exchange, State Reserve and other entities of state regulation of grain market. The entities Trade Organization are: wholesale agricultural exchange, fairs of agricultural products, auctions, wholesale and retail markets for agricultural products, specialty shops, companies that process grain e.g. Subjects of financial settlement services are: agricultural insurance fund grants Ukraine, banks, insurance companies, credit unions, investment companies e.g. The entities providing transport and logistics are including modes of transport (rail, road, sea and river transport). There are also other entities which operate in the cereal market, such as news agencies, analytical agencies, regulatory organizations and others ones.

According to the forecasts of Ministry of Agrarian Policy and Food of Ukraine, Ukrainian agribusiness exports in the formation in the logistics software will face with the following main problems: high costs and insufficient bandwidth [5]. The specificity of the factors influencing the situation on Ukrainian grain market in the formation of grain exports, compared with a world leader grain export is showed in tab. 1.

Table 1

**Factors influencing market conditions at grain during formation grain exports**

Factors	Ukraine	Russia
1	2	3
The main pricing factors	Conjunctural fluctuations in supply and demand on the world market for the downward dynamics of nominal support market prices.	Forecast prices and costs of production, creating conditions of competition are minimized by conjunctural differences in prices of domestic and world markets.
The principle of pricing	Established based on demand, manufacturers are not able to correctly predict grain prices.	Due to the level of prices for Ukrainian grain, accompanied by a multiplicative reaction of the rest of the segments.
The level of prices per unit of production	High level	The lower level (a few dollars)
The presence of export duty	Absence	Presence
The cost structure	Higher production costs due to import many resources and high cost of energy carriers	Lower production costs due to lower cost of energy carriers
The structure of production and consumption	The leader in export of grain to Europe. Production for domestic consumption and export	The world leader in grain exports. For the central regions the most effective is import For the North Caucasus - export, North - imports via the Baltic Sea
Features logistics	Deep sea ports, power grain terminals in the ports allows to handle up to 33 mln. Tons. of grain (capacity utilization at 85 %), but the cost of transshipment through the ports is higher than in Russia the level of logistics costs in ports by 40 % more than in Germany and 30% more than in the US. Optimizing of grain loading at the ports by using container cranes and a pair of 20-foot containers (normal load is 16–18 ths. Tons per day, or 12 ths. Tonnes. larger than previous). The share of rail transport in export of grain increased to 65 % (35 % – vehicles), number of grain – 13,6 ths. Units. 30 % of which went out of use. The introduction of an online monitoring system available cars. Creation of logistics companies from harvesting to the port (“Chernihiv Industrial Dairy Company”, “Ukrlandfarminh”, “Transcom Ukraine”). Attracting investments in infrastructure will allow the river to transport up to 1 mln. Ton. of grain from Nikolaev and Kirovograd regions.	Lower cost of transshipment through the ports, proximity to areas, bordering land and have a need to import grain actualize road and rail transport with lower logistics costs. The transport system is one of the largest in the world.

Source: based on systematic [11, 14]

Table 2

**Problems grain industry in Ukraine and their solutions**

Number	Name	Title essence	Causes	Ways of solving
1	2	3	4	5
1	1. Lack of modern storage facilities and containers for storing grain.. The moral and physical deterioration of public equipment large reinforced concrete silos (which kept the bulk of the grain) with primitive advantage floor grain storage technology without proper laboratory quality control of grain	The threat of losing grain during storage, which leads to high dependence of manufacturers owners elevators and grain traders to implement and makes for grain unsuitable for them online.	The moral and physical deterioration of public equipment large reinforced concrete silos (which kept the bulk of the grain) with primitive advantage floor grain storage technology without proper laboratory quality control of grain. Inconsistency daily capacity receipt and shipment of grain transport modes: road - almost twice the railway - a quarter higher sea - was higher than 11,7 times for ships and 4,7 t. for barges.	Attracting investments; State program of supporting grain producers for developing warehouse infrastructure; loans with low interest rate. Adjustments to daily receiving capacity and shipment of grain.
2	A low level of agricultural enterprises with modern technological equipment for the transport and storage of cargo.	Significant percentage of losses of grain during movement from producer to consumer.	The lack of funds to purchase high-tech equipment (e.g, vertical silos with capacities compatible receivers for cars-grain).	Providing by state agricultural engineering, implementation of state programs to finance agriculture, attracting foreign investment. Mechanization and automation of logistics operations
3	Low level of information support industry and farmers in particular.	The low level of use of software, databases, electronic document management, mobile applications (on yield, moisture, weather conditions, grain prices, access to bank accounts, etc.)	Lack of working capital to ensure a high level of information provision industry.	Attracting investments and state assistance for the establishment of modern logistics information system for the grain market (GPS, the device combines to create and use maps crops, etc.).
4	Barriers of entry and operation in industry	Corruption in the management of the flow of grain, abuse of power in public enterprises in public procurement.	Inspection control the certification of grain for the domestic market, the annual certification granaries, artificial quarantine zone for which required phytosanitary authorization, etc., leading to increased transaction costs.	Transparent control system that performs the regulatory function and adapted to international conditions.
5	Problems in the field of road transport grain deficit of road transport in peak periods of agricultural campaigns.	Lack of road routes that can withstand high load.	The poor quality of road infrastructure (especially in rural areas); vehicles with expired technical resources and kept out of the implementation of international flights; overloading of transport which cause higher prices for transportation; Cereal difficult market conditions due to the partial mobilization cars for the needs of ATO.	Increase of powerful transport, road construction lines that are able to withstand the load of 40 tons and rationalization of routes of transportation.

Continuation table 2

1	2	3	4	5
6	Problems in the area of grain transportation by rail.	The deficit in railway transport peak periods agrarian campaigns, low quality traffic, growth rates for the use of own wagons and cargo transportation costs, respectively, contributing to the outflow of particles loads on vehicles.	Inconsistency of the material and technical basis of railway transport and process requirements of consumers and European standards of quality transport services. Lack of equipped trains; deregulation of pricing for services Wagons boot the shortage of resources.	Improving the efficiency of rail transport by optimizing logistics (grain-trains, routing rail traffic instead ones items); the formation of flexible fares for considering seasonal factors and eliminate foreign exchange risks.
7	Problems with the transport of grain river transport (for example, inland waterways)	Low bandwidth usage in the port cargo handling. Load-outdated fleet and handling equipment; seasonal traffic; failure and inadequacy safety of navigation guaranteed by the designed depth in certain areas.	Outdated port infrastructure, the presence of excise taxes on petroleum products to river transport, unsatisfactory technical condition gateways, caused a reduction in investment, lack of funds needed for their upkeep and maintenance. Insufficient use of existing capacity inland waterways; imperfection of legislative and normative acts on regulation of the industry.	Requires credit and implementation of investment projects on development of river infrastructure in order to develop the logistics attractiveness of logistics cent water transport; participation in the system of distribution of goods and the provision of additional marketing and logistics services; use of through tariff rates.
8	Problems with transportation of grain by sea (for example, export and transit flows).	Low efficiency of cargo handling and documentation, overtime passage control, simple vessels, long customs clearance, additional unauthorized charges.	Provide transport and logistics services in the Port imperfect system of customs clearance, high levels of corruption and low public support, the lack of a mechanism to attract additional investments.	Increasing the attractiveness of logistics port by entering the part of the international transport hubs and integration into the global transport infrastructure, development of transport security and port infrastructure
9	Uncoordinated operation of enterprises related logistics infrastructure facilities in the provision of logistics services	The presence of "bottlenecks" in point of the various objects logistics infrastructure during the cycle of manufacturing operations for the transfer of grain.	The low level of infrastructure, information industry, logistics management of the cereals market.	Formation of a network of multimodal transport and logistics centers for the purpose of integrated logistics services and achieve the greatest economic efficiency of logistics infrastructure facilities (by increasing the reliability of transport connections and synchronization of related logistics infrastructure facilities) on a single information platform.
10	Inefficient logistics management of agricultural companies.	Previous methods of logistics management, limited access to information and communication technologies without proper planning for growing crops, low efficiency of land cultivation (cultivation, processing, fertility).	Previous methods of logistics management, limited access to information and communication technologies without proper planning for growing crops, low efficiency of land cultivation (cultivation, processing, fertility).	More efficient use of land. Planning growing crops on land (who, when, how). Improving the quality of grain production and the final product. Features agronomic solutions, the development of IT technologies (GPS, flying drones, sensors in the ground). Operational planning and for cooperation between stakeholders

1	2	3	4	5
				transportation of grain; improving the accompanying documentation, computerization and make better management decisions.
11	Low investment in the sector.	Low levels and investment in agriculture.	Gaps in the regulatory framework and the unstable political situation in the country.	Creating a positive image of Ukraine as a subject of world grain market, accelerate the process of harmonization of national legislation with EU legislation. Simplification and reduction procedures for obtaining quarantine and customize certificates.
12	Lack of government programs for the development of the industry.	Not perfect public policy problems grain industry (from the formation of export potential, implementation of logistical approaches).	The ineffectiveness of functioning public institutions in the field of grain market.	The development of the state program of Ukraine grain industry and transport infrastructure. Gain control of the Antimonopoly Committee of activity. Saving a single agricultural tax, the VAT specialized treatment, priority purchase of grain in the state food reserve, support for all forms of industrial cooperation. Facilitating access to credit. Saving the fixed tax established by law to January 1, 2018
13	Pricing for grain by grain traders.	Publication of data on the volume of grain harvest before the spring field work in the media business leaders, local government and the state grain traders in advance makes it possible to form a grain prices in their own interests (excluding interests of producers and the relatively higher margin).	Typy high openness and transparency in the handling of future data volumes of grain harvest in the country.	Non advance information on the volume of harvest crops.
14	Lack of qualified workers in the grain sector	Lack of quality products and services provided by the sector due to lack of qualified personnel.	Insufficient funding for the grain industry. Lack of motivation (low wages, etc.).	Conducting exercises referral to training, adopting foreign experience, motivation of employees to improve efficiency.
15	Environmental load	The use of trucks that do not meet specifications (for example ISO 3649: 2010) and environmental standards (environmental standard Euro emission of harmful substances into the atmosphere).	Lack of funds for agricultural producers updated rolling stock.	Attracting investment, loans with low interest rates, ban the use of vehicles that do not meet environmental standards (environmental class Euro standards governing emissions into the atmosphere.

Source: based on systematic [4–11]

Favorable factors for the development of the grain industry in Ukraine are in the tab. 3.

Table 3

**Favorable factors for the development of the grain industry in Ukraine**

Number	Name	The essence of the factor	Reasons
1	2	3	4
1	Growing competition are on the freight market in the domestic and international communications.	Increased intersectoral competition (between different kinds of transport) for freight flows, for getting the most revenue, for the right of access to the market of freight traffic. Increased competition in the supply of grain between the Russian and Ukrainian grain traders.	Demonopolisation national economy on the freight market, which contributed to the emergence of active entities of different ownership forms, which are included in the transportation process.
2	The only comprehensive strategy for the	Ministry of Agrarian Policy and Food of Ukraine has drafted a single comprehensive strategy to develop agriculture and rural areas in 2015 -2020 to solve the	The need to develop a plan for development and agricultural reform.
	development are agriculture and rural areas for 2015–2020	real needs of the industry, as a result of a comprehensive process of consultation with stakeholders, including civil society, business, and international donors. The project is funded by the EU.	

Source: based on systematic [12]

In view of the lowest cost of transport, high environmental and concentration along the water a large number of production companies to resume development potential in the transportation of grain can waterways transport (it is known that in 2007 freight was about 15 mln. Tons. In 2015 – only 4 mln. 200 ths. tons of goods):

- Manufacture companies positioned at 50–70 km. near the Dnieper basin produces about 63 % of GDP, which would amount to 26 mln. tons of cargo in the event of transportation by river transport on the Dnieper. In this area annually grows about 25 mln. Tons of grain. Among them – 10 mln. Tons – grain exports. The main feed grain exports – the sea (92 %). Shipping grain for export is carried out on the Dnieper River in ports or ships of the “river – sea” in the countries of the Black Sea and East Mediterranean.

- development of river transport is possible by creating transit corridors through the Baltic Bug, Pripyat, Dnieper and river access to foreign companies through competitive tariffs

- from 2018 in Europe is planned introduction of a new White Paper and restrictions cargo with a maximum distance of 150 km. that will create demand for rail and river transport [14].

**Conclusions and recommendations for further research.** The importance of logistics in the grain industry, is gradually increasing. Everything indicates that companies that operate in the grain market of Ukraine for further development will require the use of logistical tools to match the leaders on the world grain market.

The study:

1. The analysis of market conditions grain Ukraine.

2. Identified key factors influencing the market conditions during grain formation on grain exports.

The main ones are: the pricing factor pricing principle, the price level per unit of output, cost structure, the structure of production and consumption, especially logistics.

3. In the paper analyzes the problems of the grain industry. The main ones are: the lack of a sufficient number of equipped storage facilities, poor information management, transportation problems and the problems of environmental load. Based on the systematization problems suggested solutions. Also the favorable factors for the

So, to solve the problems of Ukraine grain industry need a comprehensive approach to determining the ways and means to address them. Important among the solutions to the problem of efficiency of the grain market of Ukraine is the improvement of the quality control of grain and certification in accordance with international standards, the development of logistics infrastructure grain market of Ukraine, storage and transportation of grain tariffs for transporting grain, support economic mechanisms stimulating renewal of fixed assets agricultural enterprises. In further studies should focus on the study of the elasticity of demand for grain and solving logistical problems of grain market in Ukraine to improve the competitiveness of enterprises working on it.

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