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Peculiarities and systematization of the characteristics of logistic support of the agrarian sector of Ukraine

Abstract

Purpose. The logistics system is considered an integral component of the development of modern society. Logistics of supply, storage and production are components of the logistics support of the agricultural sector of the economy. The efficiency of commodity flows and the development of individual industries as a whole depends on the work of transport and logistics support. Advances in technology and management principles are improving the movement of goods, speed of delivery, quality of service, operating costs, use of facilities, and energy savings. The importance of the impact of transport and infrastructure facilities for product storage on the logistics support system is identified, which causes the problem of maintaining an appropriate level of storage quality. *Methodology.* The research is based on the methods of analysis, synthesis and comparison. Causal analysis was used to determine the key indicators of the methodology for assessing the effectiveness of logistics support of the agricultural sector. The purpose of the work is to study the characteristics and systematization of the characteristics of logistics support of the agrarian sector of the economy of Ukraine. *Practical implications.* The practical value of the work lies in the substantiation and highlighting of system characteristics of logistics support of the agricultural sector of Ukraine. Agro-industrial complex is one of the main levers of influence on the formation of export potential of Ukraine. The largest volume of sales, in particular export deliveries, is determined by the branch of crop production, where the largest share is taken by grain and oil-bearing crops. The specifics of the organization of supply chains and logistics determine the complexity of the construction and operation of logistics infrastructure. The hidden impact of logistics costs both on the supply chain as a whole and on its individual sections is reflected in the profitability and profitability of enterprises and the industry. In this regard, the systematization of indicators and their use in the real assessment of the functioning of logistics infrastructure allows to identify bottlenecks in the organization of integrated supply chains of the agricultural sector. *Value/originality.* The specifics of this study are manifested in the identification of the peculiarities of the functioning of logistics infrastructure, which allow to define indicators for its assessment as an integral system that adapts to changes in the domestic and foreign markets.

Keywords

logistic support, system characteristics, agricultural products, transportation, storage, factor analysis

JEL: P40, C42, C51, O13



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1 Introduction

The beginning of this century is characterized by a significant increase in trade between countries and, accordingly, by the development of logistics. Transport logistics is extremely important in the logistics system, because without it the circulation of material flows is impossible. The transport and logistics system is a complex system with a feedback loop. It performs various logistical functions and operations, consists of several subsystems and has sufficiently developed links with the external environment. A number of studies and the experience of developed countries prove that the most effective way to develop any sector of the economy can be realized by forming a transport and logistics system in the country as a whole and in its individual regions. Especially when it comes to the leading sectors of the economy, such as the agricultural sector for Ukraine.

Ukraine has some of the best agricultural land in the world in terms of fertility. The available resource potential allows for almost a doubling of annual grain yields. To date, much has been done to modernize the existing logistics system to increase export potential, namely, port transshipment facilities have been improved, existing port terminals have been rebuilt and expanded, inland river navigation has been revived, and road transport has been improved. At the same time, the country still needs large-scale investments in logistics infrastructure. Lack of modern storage facilities for agricultural products and the high level of deterioration of infrastructure facilities are currently a significant obstacle to effective exports (Agroportal).

When studying logistics support, in addition to the issue of transportation, significant attention should be paid to the infrastructure for product storage. Domestic producers have storage facilities for 40-50 million tons of grain products, but only about half of them are certified. At the same time, all elevators in Ukraine should undergo annual certification. At the same time, the quality of storage is another problem. Deficit of modern elevators in Ukraine works in favor of grain traders, who exploit their own modernized capacities of private elevators. Thus, the study of system characteristics of logistic support of the agricultural sector of the economy is very important and absolutely necessary in the context of increasing export opportunities.

The logistics system is considered an integral component of the development of modern society. The work of transport and logistics support determines the efficiency of commodity flows and the development of individual industries as a whole. Advances in technology and management principles improve the movement of goods, speed of delivery, quality of service, operating costs, use of facilities and energy savings. Transportation ensures the movement of materials in the supply chain from points of origin to the destination where goods are consumed. Most

agricultural enterprises use inbound and outbound logistics. Inbound logistics includes the purchase of materials and goods from suppliers. Outbound logistics includes the delivery of materials and goods to consumers. Logistics of supply, storage and production are the components of logistics support of the agricultural sector of the economy (Gutorov, Prozorova, Prozorov, 2013).

The development of the agrarian sector of Ukraine is one of the priority tasks of the state leadership. Recently, more and more attention is paid to the organization of agricultural production on the basis of branched production structures such as agricultural holdings, corporations, concerns, etc., which can concentrate all stages of operational cycles from the cultivation of raw materials (agricultural products) to the final product of processing (food products). At the same time, most of the costs of organization and production are carried out at the stages of raw product cultivation, which is due to the specifics of agriculture. Thus, it becomes relevant to study the methodology of logistics of agricultural enterprises, the identification of its system characteristics, the construction of efficiency criteria for logistics systems of the agricultural sector.

One of the priorities of economic recovery of Ukraine was and remains the development of the agricultural sector, which is primarily related to the food security of the state.

In the conditions of globalization of economic transformations the main subjects of the agricultural market became large organizational formations of the type of integrated production structures – agricultural combines, agricultural holdings, concerns, corporations, whose activities are aimed at increasing the scale of agricultural production and centralization of the main production facilities (Kornietskyi, 2015). In Ukraine, about 40 production associations own more than 50,000 hectares of land, 150 enterprises have a land fund of 20,000-50,000 hectares and have the potential to expand land and transform it into agricultural holdings (Potapova, 2019). The amount of land used in agricultural production in Ukraine is 32-33 million hectares, of which 40% is cultivated by small and medium-sized farms. The number of workers in such enterprises is determined by territorial feature, i.e., workers live in these territories and are mostly elderly people, which is the main component of the increase in labor shortage. The financial management of small and medium-sized businesses in rural areas faces a significant problem of loan repayment, while agricultural holdings associated with foreign capital are able to obtain cheap credit funds from international banks. Justified inability to cope with growing risks and financial problems increasingly leads to the restructuring of the agricultural market, which is manifested in the displacement of small businesses and the emergence of strong players, such as agricultural holdings,

corporations, etc. Management of such structures requires new approaches based on a systemic understanding of key problems and their solution from the lowest level of the hierarchy (subsidiaries) to the highest (parent company).

Agricultural business, compared to other activities, is characterized by a fairly high risk associated primarily with the availability and quality of raw materials, which makes the introduction of logistics technology relevant both at individual enterprises and at the regional and national levels. In this regard, the logistics of agricultural enterprises needs a systematic approach (Potapova, Volontyr, 2022), which results in an established management mechanism based on the key performance characteristics of the flow of orders, products (raw materials, materials), finance, as well as their organization and maintenance. In this case, flows are managed, the movement of which generates processes and operational cycles as a whole. In accordance with the formation of processes, the structure of the logistics of agribusiness enterprises is determined by their organizational features for: small and medium enterprises, large and integrated production structures. For small and medium-sized enterprises, logistics management can be concentrated both in a separate unit with clearly defined functions, and coordinated at a specifically defined level within the organizational and structural unit. In large enterprises and production associations, the logistics management system is ramified and mainly depends on the mechanism of interaction between structural units. Thus, the logistics systems of co-productions can meet different goals and have different system characteristics:

1. Agribusiness companies formed through successive mergers or by gaining leverage over small businesses united by a common type of activity (horizontal integration). The goal of such groups is to obtain new and maintain stability in existing segments of the produce market. Organizational and logistics systems of such associations can be a set of subsystems of logistics management of equivalent enterprises – branches or subsidiaries, which have a centralized mechanism for coordinating activities at the level of the parent management body.

2. Companies that are associations of enterprises of a single technological cycle through vertical integration (from raw materials to the production of finished products). The purpose of such associations is to minimize the overall cost of production due to scale, obtain small fluctuations in sales prices, which in turn provides stability and balance in the competitive environment of other enterprises. Thus, the logistics management system is a number of related subsystems, which are managed at points in the chain of the technological cycle from enterprises engaged in the production of raw materials, with consistent formation and transfer of controlling influence on the level of processing and production of the final product.

2 Specifics and system characteristics of logistic support of the agrarian sector of the economy

To analyze logistics support, it is worth reviewing the available cargo turnover of domestic enterprises (Figure 1) and freight turnover in Ukraine in 2018–2020, in % compared to the corresponding period of the previous year (Table 1). Analysis of

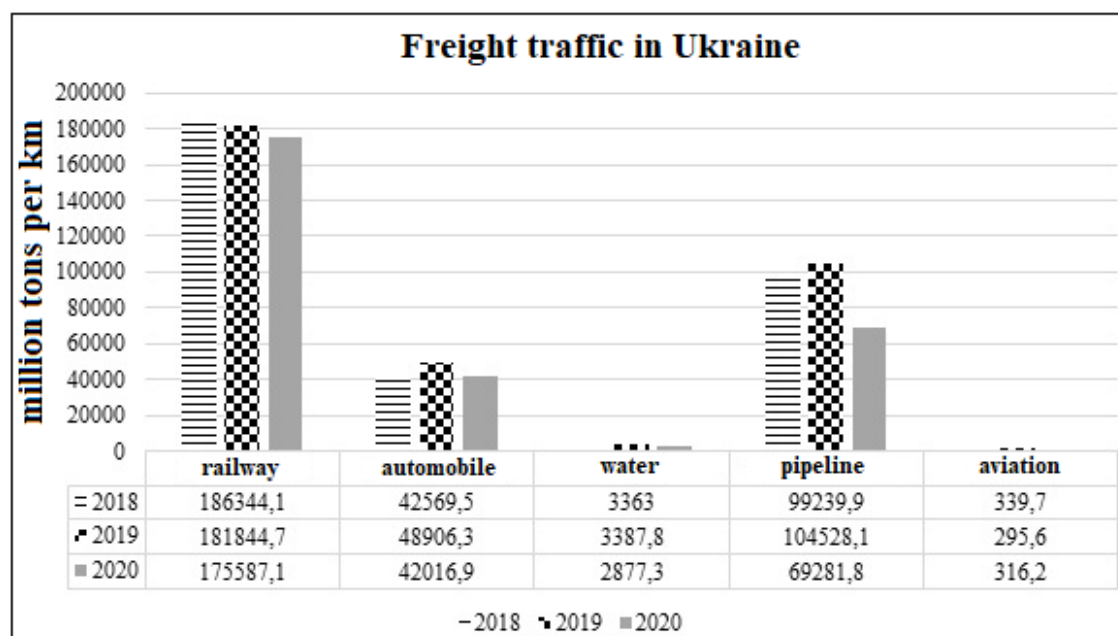


FIGURE 1 Freight turnover of transport enterprises

Source: calculated according to data (State Statistics Service of Ukraine E-source)

TABLE 1 Freight traffic in Ukraine, 2018–2020, in % compared to the corresponding period of the previous year

Means of transportation	2018	2019	2020	Deviation 2020 from 2018, %
In total	96,7	102,1	85,6	-11,1
including:	97,1	97,6	96,6	-0,5
– railway				
– automobile	102,7	114,9	85,9	-16,8
– water	78,7	100,7	84,9	6,2
– pipeline	94,1	105,3	66,3	-27,8
– aviation	123,4	87,0	107,0	-16,4

Source: compiled and calculated according to the data of the State Statistics Service of Ukraine (Statistical collection "Agriculture of Ukraine" for 2019)

statistical data allows the conclusion that over the past three years, the largest freight turnover is by rail, and the smallest – by aviation, and the volume of air transport decreases every year.

The above data show that in 2018–2020, there was mainly a decrease in the volume of freight traffic. The exception is 2019, in which volumes mostly increased (except for rail and air transport). Despite the negative downward trend in total freight volumes in 2020, which was 14.4% lower than the previous year, rail freight volumes decreased by only 3.4%.

Positive tendency of growth of water transportations indicators by 6.2% should also be noted. Cargo transportation by inland water transport is one of the cheapest and most environmentally friendly types of cargo transportation in the world, so the development of inland water transport should be a priority for Ukraine.

Modern production systems require the adaptation of logistics systems to the existing requirements of internal and external users. After all, today logistics is defined as the part of the supply chain where the flow of goods and their storage is managed, planned and monitored for efficiency. It also refers to services and related information from the point of origin to the point of consumption to meet consumer needs.

To study the effectiveness of logistics support of the agricultural sector of the economy, it is worth

analyzing the volume of agricultural production in Ukraine (Table 2). In modern economic conditions it is important not only to grow crops, but also to have capacities for their storage and transportation to end users.

Gross yield and crop yield are the most important economic indicators used to assess the condition, development and efficiency of individual crop production sectors, the entire crop production and agriculture as a whole. All agrotechnical measures, land reclamation, natural-economic conditions and the level of organizational and economic activity of agricultural enterprises find their concrete expression in the level of gross harvest and yields (Table 3).

The given data testify to the negative trend of decrease in the volume of gross harvest of the vast majority of crops in 2020, the only exception was potato production, the growth of which amounted to 568.8 thousand quintals. Decrease in the volume of gross harvest of all other types of agricultural crops is due to a decrease in their yields.

It was this factor that led to a decrease in gross crop production. Particularly significant was the decrease in gross harvest of cereals and leguminous crops – 100,867.1 thousand tons, sunflower – 34,996.8 thousand tons. Increase in gross harvest of potatoes had a positive impact on the growth of sown

TABLE 2 Harvesting agricultural crops in Ukraine, 2019–2020

Agricultural crops	Harvested area, thousand hectares			Production volume, thousand quintals			Yield, quintals per hectare of harvested area		
	2019	2020	2000 in % by 2019	2019	2020	2000 in % by 2019	2019	2020	2000 in % by 2019
Cereals and legumes	15291,9	15282,9	99,9	750832,3	649523,3	86,4	49,1	42,5	86,6
Factory sugar beet	221,3	220	99,4	102041,4	91564	89,7	461,1	416,2	90,3
Sunflower	5958,9	6480,9	108,8	152547,8	130914,2	85,9	25,6	20,2	78,9
Potato	1308,8	1325,2	101,3	202602,2	208321,4	102,8	154,8	157,2	101,6
Vegetable crops	452,4	464,9	102,8	96813,6	96420,26	99,6	214	207,4	96,9
Fruit and berry crops	195,5	191	97,7	21133,55	20169,6	95,5	108,1	105,6	97,7

Source: calculated according to data (State Statistics Service of Ukraine E-source, Statistical collection "Agriculture of Ukraine" for 2019)

TABLE 3 Factor analysis of the volume of gross harvest, sown areas and crop yields in Ukraine, 2020

Agricultural crops	Change in the volume of gross harvest, thousand tons	including due to change	
		of cultivated areas	productivity
Cereals and legumes	-101309	-441,9	-100867,1
Factory sugar beet	-10477,4	-599,4	-9878
Sunflower	-21633,6	+13363,2	-34996,8
Potato	+5719,2	+2538,7	+3180,5
Vegetable crops	-393,34	+2675	-3068,34
Fruit and berry crops	-963,95	-486,45	-477,5

Source: authors' own calculations

areas and yield, which amounted to 2538.7 thousand quintals and 3180.5 thousand quintals, respectively. The change in the volume of sunflower and vegetable crops production was positively influenced by the increase in their sown areas (13,363.2 and 2,675 thousand ha, respectively), but this influence was less significant compared to the negative impact of the reduction of yield of these crops.

Studying the infrastructure for storing agricultural products, it should be noted that the lion's share of warehouses in Ukraine was built during the Soviet era. Despite some modernization after the first wave of privatization in the 1990s, many capacities, especially granaries, remain obsolete. Infrastructural facilities for storing agricultural products in Ukraine are still underdeveloped. About 80% of farmers do not have access to equipment for grain cleaning and drying, which leads to significant (5-7%) crop losses, reduces the quality of final products and price (Strategy and Action Plan for Sustainable Logistics for Ukraine (Draft)).

Granaries account for 54% of total storage, and elevators for the remaining 46%. A significant number of domestic granaries are not mechanized and, as a rule, are not equipped with machines for drying and cleaning. They are able to store grain only 3-4 months,

while modern elevators – up to 2 years (Sustainable Logistics Strategy and Action Plan for Ukraine (Draft)). High humidity, which is a consequence of different moisture content and temperature changes in different periods of time, can significantly degrade the quality of grain during storage. Given the above, it is now necessary to attract investment to modernize existing logistics facilities. As a result of the implementation of the above it is possible to increase the added value in the production of agricultural products. The growth of agricultural production and the dynamics of gross value added by types of economic activity determine the need for appropriate adaptation of logistics systems.

It is necessary to analyze the gross value added by types of economic activity of Ukraine, in actual prices, million UAH, 2017–2020 (Table 4). The predominance of the growth rate of the total gross value added over the dynamics of gross value added of agriculture, forestry and fisheries led to a decrease in the share of the industry in its total value, the decrease in 2020 compared to 2017 and 2018 was 1.3 and 1.2% respectively. Over the past year, the negative trend has been replaced by a positive one, with an increase in the share of agriculture, forestry and fishing in total gross value added of 0.4%.

TABLE 4 Gross value added by types of economic activity in Ukraine, in actual prices, UAH million, 2017–2020

Activities	2017	2018	2019	2020	2020 to 2017, %	2020 to 2018, %	2020 to 2019, %
Gross value added (base prices)	2516906	3017896	3421628	3594990	142,8%	119,1%	105,1%
Agriculture, forestry and fisheries	303419	360998	356563	388428	128,0%	107,6%	108,9%
Share of agriculture, forestry and fisheries in gross value added, %	12,1	12,0	10,4	10,8	-1,3	-1,2	+0,4
Industry	64431	81259	107430	120274	186,7%	148,0%	112,0%
Construction	409256	471618	525974	584817	142,9%	124,0%	111,2%
Wholesale and retail trade; repair of motor vehicles and motorcycles	190825	227140	264689	262128	137,4%	115,4%	99,0%
Transport, warehousing, postal and courier activities	64431	81259	107430	120274	186,7%	148,0%	112,0%
Temporary accommodation and meals	18727	25112	35311	26907	143,7%	107,1%	76,2%
Other economic activities	900387	1103715	1341023	1459665	162,1%	132,3%	108,8%

Source: calculated according to data (State Statistics Service of Ukraine E-source, Statistical collection "Agriculture of Ukraine" for 2019)

Given the growth in production, storage capacity must also be increased. Domestic grain storage capacity ranges from 25,000 tons to more than 200,000 tons, and the capacity of each individual elevator ranges from 8,000 to 25,000 tons. Poltava, Odessa, Dnipro, Vinnytsia, and Kropyvnytskyi regions have the largest volumes for grain storage in Ukraine, which make up 38% of the total national capacity. Given further investment in storage infrastructure, the total capacity of elevators in the next 10 years will increase to 12-15 million tons.

The existing domestic logistics systems are adapted mainly for the export of raw materials. At the same time, analyzing the production of certain types of food industry products, it is possible to conclude about the need to create closed production cycles for certain types of food products (Table 5).

This is especially true for those types of food industry products for which there is a significant increase in production volumes – chicken, frozen meat, frozen pork.

It should be noted that state operators are the main players in the market of agricultural products storage in Ukraine. Their joint storage capacities amount to about 5.6 million tons, or 18% of the total volume. The Grain Corporation of Ukraine, which includes "Khlib Ukrainy", is the largest owner of elevators in the country and the most powerful state operator.

Traders represent the second largest group of owners of warehouses with modern elevators for storing agricultural products. Swiss company Glencore

owns storage facilities in Ukraine with a total capacity of 1.9 million tons (6% of the total volume). This company is the largest among private enterprises. Another major exporter of agricultural food products is Nibulon, which has storage capacity of up to 1.6 million tons (5% of the total volume). Its infrastructure includes a modern terminal, Mykolaiv port, elevators and river terminals in Dnipro, Cherkasy, Poltava and Zaporizhzhia regions. The main integrated agricultural companies jointly own a capacity of 6.2 million tons or more than 20% of the total volume in the country. Domestic agro-industrial companies have invested more than 150-250 USD per 1 ton of storage capacity for agricultural products. In this case the costs associated with the construction of a new elevator can pay off in 5-7 years.

It should be noted that producers are adapting to modern market conditions and beginning to develop their own logistics infrastructure. Modern steel elevators and silos built by agroholdings offer reliable mechanisms of grain quality control, as they are equipped with temperature control, aeration and insect detection technologies. In addition, the grain in modern silos can be easily rotated and dried.

In recent years the agricultural sector has been characterized by a fairly high level of efficiency, but the dynamics shows a downward trend in the level of sector efficiency: the share of enterprises with pre-tax profits decreased and the share of loss-making enterprises increased accordingly (Table 6).

For the analyzed period the financial result before taxation increased by 10,826.5 million UAH,

TABLE 5 Production of certain types of food industry products in Ukraine, thousand tons, 2017–2020

Types of products	2017	2018	2019	2020	2020 / 2017, %	2020 / 2018, %	2020 / 2019, %
Beef and veal, fresh or chilled	58,5	56,3	55,8	41,5	70,9%	73,7%	74,4%
Fresh or chilled pork	228,2	222,7	226,2	225,2	98,7%	101,1%	99,6%
Beef and veal in frozen form	18,4	20,2	16,6	11,7	63,6%	57,9%	70,5%
Frozen pork	6,6	6,7	11,8	14	212,1%	209,0%	118,6%
Meat of chickens, fresh or chilled – carcasses	319,8	266,9	249	226,7	70,9%	84,9%	91,0%
Meat of chickens, fresh or chilled – parts of carcasses	455,8	412,4	391	348,9	76,5%	84,6%	89,2%
Meat of chickens, frozen – carcasses	76,8	103,8	128,4	153,5	199,9%	147,9%	119,5%
Sausage and similar meat products	247,1	247,8	236,6	236,4	95,7%	95,4%	99,9%
Tomato juice, millions of liters	44,2	47,3	45,4	41,8	94,6%	88,4%	92,1%
Apple juice, millions of liters	74	105,9	100,6	63,4	85,7%	59,9%	63,0%
Mixes of fruit and vegetable juices, millions of liters	186,8	184,3	188,6	171,5	91,8%	93,1%	90,9%
Butter with a fat content of no more than 85%	108,4	105	91,6	87,5	80,7%	83,3%	95,5%
Grated, powdered, blue and other hard pressed cheese	94,3	97	86,1	85,2	90,3%	87,8%	99,0%
Melted cheese (except grated or powdered cheese)	27,1	28,6	29,5	30,6	112,9%	107,0%	103,7%
Wheat or wheat and rye flour	1991	1746	1737,6	1549,3	77,8%	88,7%	89,2%
Bread and bakery products, short-term storage	1072,6	975,1	892,7	794,7	74,1%	81,5%	89,0%
White refined beet sugar in solid form	2042,7	1753,6	1490	1022	50,0%	58,3%	68,6%

Source: calculated according to the data (State Statistics Service of Ukraine E-source, Statistical collection "Agriculture of Ukraine" for 2019)

TABLE 6 Indicators of agricultural production efficiency in Ukraine, 2018–2020

Indicators	2018	2019	2020	Deviation 2020 from 2018	Deviation 2020 from 2019
Financial result before taxation, million UAH	70770,2	93553,6	81596,7	10826,5	-11956,9
Enterprises that received pretax profit as a percentage of the total amount	86,8	83,5	83,2	-3,6	-0,3
Financial result, million UAH	93549,5	115852,7	108100,9	14551,4	-7751,8
Enterprises that made a loss before taxation, as a percentage of the total amount	13,2	16,5	16,8	3,6	0,3
Financial result, million UAH	22779,3	22299,1	26504,2	3724,9	4205,1
Net profit (loss), million UAH	70461,8	92892,9	81032,6	10570,8	-11860,3
Enterprises that received a net profit as a percentage of the total	86,7	83,5	83,1	-3,6	-0,4
Financial result, million UAH	93249	115197,6	107547	14298	-7650,6
Enterprises that made a net loss as a percentage of the total	13,3	16,5	16,9	3,6	0,4
Financial result, million UAH	22787,2	22304,7	26514,4	3727,2	4209,7
The level of profitability of all activities, %	14,2	16,6	13,9	-0,3	-2,7
The level of profitability of operating activities, %	18,9	19,8	19	0,1	-0,8
Number of employees, thousands of people	479,8	472,1	443,7	-36,1	-28,4

Source: State Statistics Service of Ukraine, 2020 (State Statistics Service of Ukraine E-source)

but compared with the previous year decreased by 11,956.9 million UAH. There is also a decrease in the overall profitability of agricultural enterprises.

It should be noted that the production of plant products remains more profitable. At the same time, systemic relationships play a not insignificant role in the formation of costs, since the costs of agricultural enterprises specializing in the production of plant products depend on industrial enterprises (chemical, energy, food industry) and have a significant export-import potential, for example, for such types of products as oilseeds and cereals. Livestock production is less profitable, although in recent years, thanks to government support, the industry has moved beyond the threshold of unprofitability. The costs of livestock production depend not only on the significant influence of industrial enterprises, but also on the sphere of crop production (production of fodder crops).

3 Conclusions

Integration properties of agricultural logistics systems allow to achieve the main goal of logistics: to deliver products of required quality in a given quantity at a given time in a given place with minimal costs. The possibility of establishing the production of products with added value and the formation of export consignments of products depends on the level of logistics support. Under market competition, a significant number of domestic integrated formations of agrarian business, adapting to market conditions, actively develop their own logistics facilities.

Analysis of crop yields and available capacities for product storage leads to the conclusion that

small producers and farms have significant problems with the logistics of growing and selling agricultural products. Small farms do not have working capital and experience difficulties in attracting credit in a limited credit environment and cannot finance the construction of new elevators and granaries. Access to the logistics network among small producers and agricultural holdings is unequal. This situation requires state regulation and the creation of a mechanism of cooperation between farms for the development of logistics infrastructure.

The introduction of modern information technology in logistics requires addressing the following issues: minimizing order processing time; consolidation of orders into one order; personalization of access; storage of large amounts of information; minimization of transaction time in order processing.

The main tasks of financial flow management in agro-industrial complex logistics can be considered as the search for optimal alternative solutions for attracting financial resources and the efficiency of their use through the implementation of effective projects. The growing volume of investments requires a more perfect mechanism of their use.

Therefore, the agricultural sector needs more research in the direction of logistic processes, the analysis of which is impossible without determining the characteristics of the system. The identification of such characteristics allows us to form the basis for a formalized description of the general criterion for the effectiveness of the logistics system, the functioning of which is inextricably linked to the likely profit by optimizing the supply chain in agricultural formations from the production of raw materials to the manufacture of the final product.

References

- [1] Agroportal. E-source: <http://agroportal.ua/news/>
- [2] Boiko, S. S. (2017). Logistics Activity at Enterprises of the Agro-industrial Complex. Information Technologies: Science, Engineering, Technology, Education, Health. Ch. IV. E-source: http://www.kpi.kharkov.ua/archive/MicroCAD/2017/S23/tez_mic_17_IV_p.179-p179.pdf
- [3] Chimosh, K. S. (2020). Analysis of Modern Global and Domestic Trends in the Development of Transport Logistics in the Agricultural Sector of the Economy. *Economy and the State*, 9: 112–114.
- [4] Gutorov, O. I., Prozorova, N. V., & Prozorov, R. G. (2013). Formation of Logistics Systems in Agriculture: monograph. Kharkiv.
- [5] Kopeika Olga (February 20, 2017). Problems of Agricultural Logistics of Ukraine. E-source: <http://logist.fm/publications/olga-kopeyka-problemy-agrarnoylogistiki-ukrainy>
- [6] Kornietskyi, O. V. (2015). The Importance of Logistics for the Agro-industrial Complex Approach. *Effective Economy*, no. 8. E-source: <http://www.economy.nayka.com.ua/?op=1&z=4240>
- [7] Kysh, L. M. (2019). Logistic Support for the Development of the Economy under the Conditions of Globalization. *Economy. Finances. Management: Topical Issues of Science and Practice*, 4: 52–60.
- [8] Official site of the Ukrainian Agrarian Confederation. E-source: <http://agroconf.org/content/>
- [9] Official site of Ukrzaliznytsia. E-source: <https://www.uz.gov.ua>
- [10] Oksana Yakovleva. Logistics as a Competitive Advantage in the Development of Agribusiness in Ukraine. E-source: <https://agropolit.com/blog/58-logistika-yak-konkurentna-perevaga-u-rozvitku-agrobiznesu-v-ukrayini> (accessed June 07, 2021).
- [11] Omelianchuk Inna. Will agrologistics save the Ukrainian village? E-source: <http://a7d.com.ua/agropoltika/5603-chi-vryatuye-ukrayinske-seloagrostika.html>
- [12] Potapova, N. (2019). Forecasting the Dynamics of Current Logistics Material Costs of Agriculture in Ukraine. *Economy. Finances. Management: Topical Issues of Science and Practice*, 4: 41–52.
- [13] Potapova, N., & Volontyr, L. (2022). System Approach in Modeling the Processes of of Agro-logistic Systems Functioning. *Economics & Education*, 07(01): 20–24.
- [14] Potapova, N., Volontyr, L., & Zelinska, O. V. (2020). Structurization of the Regions of Ukraine by the Indicator of Cash Estimation of Agricultural Lands. *Economy. Finances. Management: Topical Issues of Science and Practice*, 1: 109–119.
- [15] Rzhepishevskaya, V. V., & Klochko, N. S. (2018). Logistic Principles of Ensuring the Competitiveness of Agricultural Enterprises. *Financial Space*, 2(30): 101–108.
- [16] State Statistics Service of Ukraine. E-source: <http://www.ukrstat.gov.ua>
- [17] Statistical collection "Agriculture of Ukraine" for 2019.
- [18] Sustainable Logistics Strategy and Action Plan for Ukraine (Project). E-source: <https://mtu.gov.ua/files/Logistics.pdf>
- [19] Vishnevskaya, O. M., Dvoynysyuk, T. V., & Shihida, S. V. (2015). Features of Logistics Systems of Agricultural Enterprises. *Global and National Economic Problems*, 7: 106–109. E-source: <http://global-national.in.ua/archive/7-2015/25.pdf>
- [20] Vovk, L. V. (2016). Logistics as a Strategy of Innovative Development of Agricultural Enterprises. *Agrosvit*, 12: 8–15.

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