MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE
NATIONAL AVIATION UNIVERSITY
Faculty of Transport, Management and Logistics
Logistics Department

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BACHELOR THESIS

(EXPLANATORY NOTES)

OF GRADUATE OF ACADEMIC DEGREE

«BACHELOR»

THEME: **«Information support for the control of the agro-enterprise transport processes»**

Speciality 073 «Management»

Educational and Professional Program «Logistics»

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Kyiv 2020

МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ
НАЦІОНАЛЬНИЙ АВІАЦІЙНИЙ УНІВЕРСИТЕТ
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ДИПЛОМНА РОБОТА

(ПОЯСНЮВАЛЬНА ЗАПИСКА)

ВИПУСКНИКА ОСВІТНЬОГО СТУПЕНЯ

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ТЕМА: ***«Інформаційне забезпечення контролінгу транспортних процесів агропідприємства»***

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TASK

FOR COMPLETION THE BACHELOR THESIS OF STUDENT

Andriy P. Stahura
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1. Theme of the master thesis: «Information support for the control of the agro-enterprise transport processes» was approved by the Rector Directive №553/ст. of May 04, 2020.
2. Term performance of thesis: from May 25, 2020 to June 21, 2020.
3. Date of submission work to graduation department: June 05, 2020.
4. Initial data required for writing the thesis: general and statistical information about agriculture market in Ukraine, general information of the "Petromikhailivske" Private Joint-Stock Company, production and financial indicators of the company, literary sources on informational support of transport processes, Internet source.
5. Content of the explanatory notes: introduction, overview of the Ukrainian agricultural sector; Logistic support of agri-food industry; transport as an important factor for an agro-enterprise's success; general information about the company; analysis of financial and economic indicators of the enterprise; analysis of transport processes of the company; agriculture GPS Guidance Monitoring and Management System; efficiency of implementation of transport monitoring system; conclusions and appendixes.
6. List of obligatory graphic matters: tables, charts, graphs, diagrams illustrating the current state of problems and methods of their solution.

7. Calendar schedule:

№	Assignment	Deadline for completion	Mark on compl
1	2	3	4
1.	Study and analysis of scientific articles, literary sources, normative legal documents, preparation of the first version of the introduction and the theoretical chapter	25.05.20-27.05.20	Done
2.	Collection of statistical data, timing, detection of weaknesses, preparation of the first version of the analytical chapter	28.05.20-29.05.20	Done
3.	Development of project proposals and their organizational and economic substantiation, preparation of the first version of the project chapter and conclusions	30.05.20-01.06.20	Done
4.	Editing the first versions and preparing the final version of the master thesis, checking by standards inspector	02.06.20-03.06.20	Done
5.	Approval for a work with supervisor, getting of the report of the supervisor, getting internal and external reviews, transcript of academic record	04.06.20	Done
6.	Submission work to Logistics Department	05.06.20	Done

Student_____
(signature)

Supervisor of the master thesis _____
(signature)

8. Consultants of difference chapters of work:

Chapter	Consultant (position, surname and name)	Date, signature	
		The task was given	The task was accepted
Chapter 1	Associate Professor, Savchenko L.V.	25.05.20	25.05.20
Chapter 2	Associate Professor, Savchenko L.V.	28.05.20	28.05.20
Chapter 3	Associate Professor, Savchenko L.V.	30.05.20	30.05.20

9. Given date of the task May 25, 2020.

Supervisor of the master thesis: _____ Savchenko L.V.
(signature of supervisor) (surname and name)

Task accepted for completion: _____ Stahura A.P.
(signature of graduate) (surname and name)

ABSTRACT

The explanatory notes to the bachelor thesis « Information support for the cor of the agro-enterprise transport processes» comprises of 84 pages, 12 figures, 9 tables, 4 appendix, 114 references.

KEY WORDS: AGRICULTURAL LOGISTICS, FIELDWORK TRANSPORTATION PROCESSES, CONTROL OF TRANSPORT PROCESSES, GSM MONITORING, FUEL AND REPAIR COSTS REDUCTION

The purpose of the research is to study the theoretical foundations and problems of information support for the control of the transport processes of an agricultural enterprise and propose and justify economically ways to design the rational informational support of transportation during fieldwork of the object of research.

The subject of the investigation is the information support for the control of transport processes of “Petromikhailivske” Private Joint-Stock Company.

The object of the research is transport processes of “Petromikhailivske” Private Joint-Stock Company.

Methods of research are scientific inquiry, empirical, analysis and synthesis, modeling, expert assessments, project analysis.

Materials of the thesis are recommended for use during scientific research, in the educational process and in the practical work of specialists of logistics departments.

CONTENTS

NOTATION

EU – European Union

GAO – Gross agricultural output

UAA – Usable agricultural area

GDP – Gross Domestic Product

SCM – Supply Chain Management

PJSC – Private Joint Stock Company

CEO – Chief Executive Officer

VAT – Value Added Tax

GPS – Global Positioning System

GIS – Geographic Information Systems

NPV – Net Present Value

INTRODUCTION

Moving agricultural products between different points in the country implies handling issues regarding perishability of products, long and tortuous supply chains marked by the presence of several operators and no alternate roads, the need to maintain a cold chain to guarantee the quality of the final product, consumption behavior and habits, and the role that health aspects and organoleptic quality play in purchasing decisions of consumers, among others. According to Pietro and Timpanaro [45], the cost the agricultural logistics vanes between 20-30% of the cost of the product. This can be even higher depending on the type of chain involved, e.g the distance from origin and the type of transportation considered. Thus, it is important to view the transportation and logistics system as a whole since "the production, exchange, distribution and consumption of agricultural products constitute the organic chain of agriculture reproduction. Any deficiency of them will affect the development of agriculture [45]".

Moreover, it is important the study of distribution networks in order to address the different issues existing between the diverse parties involved in the transportation and distribution systems of products. Daganzo [15], for example, establishes the principle of distribution network application with the goal of uniting one origin with one destination, one origin to many destinations and many to many systems using transshipment centers and providing methods to solve it. On the other hand, Agra [1] demonstrated that the costs associated with the transport of goods represent a large part of the final cost.

Several papers have been found in the literature concerning the modeling of the agri-food supply chain. Boudahn, et al [9], for example, presented a document concerned with the planning of a real agri-food supply chain for chicken meat for the city of Tlemcen in Algena. The agri-food supply chain network design is a critical planning problem for reducing the cost of the chain. More precisely the problem is to redesign the existing supply chain and to optimize the distribution planning. The

authors applied the Allocation Problem Model in order to define points in the network with the objective of minimizing the total distance between customers and these sites, or to minimize the maximum distance.

Jan and Klein [30], developed models for agricultural supply chains based on the stochastic aspects of risk and return on investment that small enterprises face, and suggest their uses and future considerations.

If you look for successful examples in other areas of retailing, it is difficult to ignore the attention of the world leader in online sales - Amazon. She is rapidly moving away from the usual retail model, where the emphasis is placed on the categories and assortment of goods, in the direction of expediting the delivery period.

Other players will have to make efforts to optimize the entire supply chain and remove ineffective links. This will help avoid duplication of work, synchronize schedules, and allow you to clearly share responsibility. Such a task will not be easy, because it requires the consent and cooperation of many participants. In addition, you need to see and understand the entire route that passes the products - from order to delivery. In order to increase the efficiency of work and control over the implementation of processes, the implementation of relevant programs and tools will be required. However, if you do not do this, everyone will feel the loss.

One solution could be to create a strategic partnership between the major chain links, such as the supplier and the seller, which will avoid costly negotiation times. In addition, it is important to work on reducing the waiting period of the goods, because every minute of idle time leads to loss of freshness of products. Perhaps in the medium term this problem will be solved by automation of transport processes: it is expected that the share of cars with built-in driver assistance systems will increase from 10% in 2015 to 40% in 2025. But there are still issues of the legislative requirements of different countries and non-compliance with standardization, which slows down the supply process.

There are other factors that can improve the shelf life of products: the output of more stable varieties of fruits and vegetables, new packaging technologies, ensuring uninterrupted deliveries with the required temperature regime.

The competitiveness of Ukrainian agricultural products on the world market is mainly priced, since Ukrainian export prices are considerably lower than world prices.

Among the key issues hampering the development of export-import operations with agricultural products, is also the problem of non-reimbursement or untimely reimbursement of value added tax to exporters of agricultural products. To maximize the effectiveness of using the tax levers of influence on export-import operations, a comprehensive approach is needed. That is, it is expedient to use the system of prediction of crop, to study the situation on the world food markets, to control the state of state reserves, to balance the normative consumption of products for food and feed purposes, to form transitional stocks for the next year. For livestock breeding, it is necessary to take into account such indicators as the amount of cattle per thousand population and the situation on world markets.

The active movement of Ukraine and its agrarian sector in the direction of integration with the markets of the EU member states should be guided by the speedy accession to the common agricultural policy of the EU member states and adjust its policy so that it can adapt to the already mentioned policy without unnecessary complications. Only a balanced and effective agrarian policy will ensure the competitiveness of agricultural products when entering the external markets.

The purpose of the research is to study the theoretical foundations and problems of information support for the control of the transport processes of an agricultural enterprise and propose and justify economically ways to design the rational informational support of transportation during fieldwork of the object of research.

For achieving the purpose, the following tasks were set:

1. Collect and analyze theoretical approaches to information support for the control of the transport processes of an agricultural enterprise.

2. Analyze the main financial and logistics parameters of the object of research.

4. Propose and justify economically ways to design the rational informational support of transportation during fieldwork of the object of research.

The subject of the investigation is the information support for the control of the transport processes of “Petromikhailivske” Private Joint-Stock Company.

The object of the research is transport processes of “Petromikhailivske” Private Joint-Stock Company.

CHAPTER 1
THEORETICAL APPROACHES TO INFORMATION SUPPORT FOR THE CONTROL OF THE AGRO-ENTERPRISE TRANSPORT PROCESSES

1.1 Overview of the Ukrainian agricultural sector

Ukraine's natural resources are well suited for agricultural production, with 69% of its territory allocated to agriculture, much of which is the especially fertile black (i.e., "chornozem") soil. Another important advantage is the year-round access to deep port capacities at the Black Sea coast, which are crucial for grain exports. A well-developed crop production sector provides cheap feed and raw materials for animal farming and food industry. Ukraine is already the world's largest sunflower oil exporter, and a leading wheat and poultry exporter.

On the other hand, a continuing lack of financial resources at the enterprise level, underdeveloped infrastructure and arbitrary state regulations hold back productivity growth. Average yields of wheat, corn, rapeseed and sunflower seed are all lower than in neighboring Poland, despite very good natural endowments. Moreover, volume of meat production other than poultry and volume of milk production are still more than 50% below the level of production in Ukraine in 1990, i.e., before the independence. Changes in agricultural policy could remove factors hampering the huge potential of Ukraine's agricultural production.

Around 5% (2.1 million ha) of the UAA in Ukraine are irrigated. Most of it is concentrated in the southern part of the country. Around 32.5 million ha of UAA are arable, and 26.9 million ha were cultivated. More than half of the Ukraine's arable land is the world's most productive black soil, providing an excellent basis for the production of crops, livestock and energy crops [69].

Overall, the area of agricultural land slowly decreases in Ukraine: by around 19 thousand ha per year due to urbanization. Even more important is soil erosion: more

than 500 million t of soil is annually eroded in the country. Every year, erosion causes loss of soil fertility that is valued at around USD 5 billion in nutrient equivalent.

Gross agricultural output (GAO) in Ukraine is mainly generated by two groups of producers, i.e., rural households and enterprises. Households are not registered as producers and do not pay taxes related to agricultural production. Although they produce agricultural goods for subsistence needs mostly, they cultivate around 38% of UAA (1.3 ha per household on average) and input around 44.9% into GAO. Agricultural enterprises are defined by the Ukrainian legislation as enterprises whose main economic activity is agricultural production. There are around 12.8 thousand of such enterprises, each cultivating around 1.2 thousand ha of arable land. In 2015, their input in GAO was 46.3%.

Other two types of agricultural producers defined in Ukraine are family farms and public enterprises (i.e., state owned). Unlike households, family farms are registered legal entities and defined by the legislation as those that are run by family members11. There are around 32.3 thousand of such farms with an average of 134 ha of arable land. Altogether they cultivate only around 10.1% of UAA and generated 7.9% of GAO in 2015. Public enterprises generated around 1% of GAO in 2015.

Households dominate the production of the entire range of livestock products, i.e., their shares were 74.9% in raw milk, 41.8% in eggs, 75.5% in beef and veal, 47.2% in pork and 15.4% in poultry output in 2015. However, the share of households has been shrinking due to the recovery of output of agricultural enterprises. Households also prevail in production of potatoes, vegetables and fruits, i.e. 97.8%, 86.1%, and 80.9%, respectively, in 2015 [3].

Agricultural enterprises play an important role in cultivation of export-oriented crops. They produced 64.6% of grains, 66% of sunflower seeds, 81.9% of rapeseed seeds, 76.3% of soya beans and 86.5% of sugar beets.

Family farms produce more crops than livestock. They produced 12.7% of total grains, 6% of sugar beets, 19.4% of sunflower seeds, 16.2% of soya beans and 16.4% of rapeseed seeds. Their inputs into the total meat and raw milk production are quite small: 2.3% and 1.7%, respectively.

Over the last decade the process of land consolidation has been taking place in Ukraine. It led to the emergence of large, vertically structured agricultural holdings. They are created for different purposes, in different sizes and organizational forms but share some common characteristics. The holdings usually consist of a, so called, "mother company" which, in most cases, is not involved in primary agricultural production but decides upon the overall strategy, production orientation and investments, and manages access to financial resources, input (including land) and output markets. This "mother company" typically includes 5 to 50 corporate agricultural enterprises of around 2-15 thousand ha each. Size of an agricultural holding may vary from 30 to 750 thousand ha. The accumulation of these impressive "land banks" is the most visible and publicly discussed feature of agricultural holdings. Because an increasing quantity of the enterprises become members of the holdings, this is one of the reasons of decreasing number of independent agricultural enterprises (from around 17.7 in 2004 to 12.8 thousand in 2019).

In Ukraine, wheat, barley, corn and sunflower are dominant crops. They cover around 70% of land cultivated. Over the last decade structure of area harvested has somewhat changed, mainly as Ukraine's response to the global market developments. In particular, areas of wheat, maize, sunflower, rapeseed and soya beans significantly increased. The most impressive expansion was recorded for rapeseed and soya beans, followed by sunflower and maize. This expansion occurred at the cost of barley, rye, oats, millet, buckwheat and sugar beets. Whereas total acreage of fruits somewhat declined, vegetables area gained additional 30 thousand ha [33].

Grains have traditionally been leading crops in Ukraine, contributing 26.5% to the gross crop output. In 2014 grain production reached a historical maximum in Ukraine: 63.8 million t. Ukraine has emerged as one of the world's top grain exporters and continues to increase its produce of exportable grain volumes. Wheat and corn dominate grain production. Some of the main reasons for this have been growing poultry and pork production and global demand for corn. The rest of grains (e.g., rye, oats, millet etc.) have been losing their production shares over the last decade.

In the last years, average grain yield increased by around 40% (to almost 4 t/ha). Better technologies, farm practices, management, production and investments into post-harvest logistics are the main reasons for this. Still, yields in Ukraine are far lower than the potential ones and those of the Western European countries.

[6] report that wheat and corn yields of enterprises that belonged to agricultural holdings were on average 17% higher than of independent producers in 2018, and that there is an increasing tendency over time. Higher yields at the agricultural holdings are most likely result from more intensive production technologies.

Oilseed crops experienced the most impressive expansion over the last decade, i.e., from 3.5 in 2004 to a record 17 million t in 2019. The impressive growth was possible because of the combination of increased sowing areas (by almost 90%) and yields (from an average 1 in 2004 to 2.1 t/ha in 2019).

Sunflower dominates production of oilseeds in Ukraine and its production is trending upwards (with some short-run fluctuations). The growth is especially pronounced in the last decade by responding to the demand from growing crushing industry. Ukraine emerged as a top sunflower oil exporter in the world with an export of 3.9 million t of sunflower oil in 2019. [6] report that, as in the case of wheat and corn, in 2010-2012 sunflower seed yields of enterprises that belonged to the agricultural holdings were on average 16% higher than of independent producers. This was a result of more intensive production technology applied at the agricultural holdings.

Production of other oilseeds, rapeseed and soya beans, have been increasing over the last decade as well. Thus, throughout 2000-2019, rapeseed seeds production expanded from 0.1 to 1.7 million t13. This occurred mainly as a response to high demand for this crop in the EU (mainly for biodiesel production): 1.1 million t of rapeseed seeds were exported to the EU in 2015. A remarkable growth of soya beans production, from 0.06 million t in 2000 to 3.9 million t in 2019, occurred mainly due to recovery of domestic livestock sector and growing world market.

After Ukraine had gained its independence in 1991, drop in production of beef was rather drastic when compared to decline in production of pork. Throughout the last

decade, market share of large swine producers has been increasing, whereas of households and private farms stagnating. Poltava, Ternopil and Donetsk regions have been leading in pork production in the last decade.

Beef in Ukraine is mainly produced as a by-product of dairy farming; about 75.5% of beef is supplied by rural households.

Decline in total meat production has been mitigated by an impressive growth in poultry sector: from 0.2 million t in 2000 to 1.1 million t in 2019. One of the main reasons for this is short production and, respectively, investment cycles. Poultry meat can be produced in a short period of time, with high feed transformation ratio. Agricultural holdings dominate poultry production: around 70.4% market share.

In 1990-2019, milk production in Ukraine decreased from 24.5 to 10.6 million t, i.e., -66.8%. Decrease in number of cows was however 74.1% (from 8.5 to 2.2 million heads). Thus, annual milk yield increased from 2.9 to 4.5 t [27]. Although milk productivity of agricultural holdings is around 11% higher than of other producers [6], milk production in Ukraine is dominated by rural households: 74.9% of total milk production. The latter adds extra costs to the entire dairy value chain due to the problems associated with difficulty to capture economies of scale both in dairy farming and in the upstream and downstream industries, problems to guarantee a large and stable supply of high quality milk, seasonality of supplies, high collection costs and other transaction costs [39].

Since recently raw milk production by households has been decreasing and by enterprises increasing. Some of the main reasons for this are decreasing number and aging of rural population, shrinking area for grazing, and the need for ensuring high milk quality.

With the establishment of independent Ukraine, the land of former collective farms was distributed among employees of these farms. When this process ended in 2001, the Ukrainian Parliament imposed a moratorium on selling of agricultural land. This prohibition is still in force. In 2019 there were 4.1 million rural households. Large share of these land owners are at the retirement age and have limited access to credit resources. As a result, the majority of owners do not cultivate land but lease it [3].

The other important aspect of Ukrainian agricultural policy is producer support. Due to constant deficit of budgetary resources Ukraine has built a support system that relies on tax benefits and exemptions rather than direct monetary transfers. In particular, in 1999 the Parliament established the, so called, fixed agricultural tax, and in 2009 special VAT regime for agricultural producers.

Several important reforms were undertaken, the central role of which belonged to the, so-called, decentralization and deregulation measures. Overall, 56 agricultural permits and procedures were cancelled in 2015-2019. For example, grain quality certificates, mandatory certification of warehouses, and licensing of import of plant protection products were abolished; issuing of phytosanitary certificates was accelerated and the registration of nitrogen fertilizers simplified. Various other permits regarding transportation of plant products, importing of chemical products for agricultural sector, livestock certification, food safety, fisheries etc. were as well abolished.

A considerable amount of effort has been invested into harmonization of the Ukrainian agricultural and food legislation with the respective EU legislation. Consequently, a number of laws were adopted such as, for example, on food safety, feed quality control, identification and registration of animals, on animal by-products and seeds. This resulted in access of Ukrainian milk and egg products to the EU market. One of the prominent side-effects of this process was facilitation of successful negotiations with Chinese authorities on access of the Ukrainian milk products to the Chinese market. Future prospects of the legislation harmonization include access of pork and beef products to the EU market.

Other changes in the agricultural policy during the last three years included costs refund for building of facilities related to animal production; creating single institution responsible for consumer protection, sanitary and epidemiological service, veterinary and phytosanitary service – Public service of food Safety and consumer Protection; conducting of the agricultural receipts pilot project; and preparing 86 public agricultural companies for privatization. On the other hand, some changes in the policy were controversial.

One of the most notorious was the prolongation of land moratorium (on an annual base) until 2018. As a result, farmers will further be unable using their land as collateral and having restricted access to credits. Another issue which generated heated debates was reformation of agricultural tax system. In particular, special VAT tax regime for agricultural producers was abolished from 2017 on [3]. At the same time, the VAT return to grain exporters was renewed.

Development of parameters which are exogenous to the model (i.e., not simulated by the model) such as GDP, GDP deflator, exchange rate of national currency and population in Ukraine, as well as world market prices of commodities are projections until 2030 of various institutions. These projections usually do not account on the possibility of future economic, financial, social or other shocks and originate from sources such as USDA, OECD-FAO Agricultural Outlook and JRC of the EC. Some of the exogenous variables are assumptions. They include production costs, land rental values and number of agricultural producers. Values of the most crucial for modeling of the Ukrainian agricultural sector exogenous variables are presented in Table 1.1.

Table 1.1 - Some exogenous variables in AGMEMOD Ukraine [58, 40, 41]

Variables	Units	2017	2019	2021	2023	2025	2027	2029	2030
1	2	3	4	5	6	7	8	9	10
Ukraine, macroeconomic factors									
Population	million	42.4	41.8	41.3	40.7	40.1	39.5	38.9	38.6
Real GDP (in 2000 prices)	UAH billion	241.9	260	281.2	303.2	328.2	355.8	385.8	401.7
GDP deflator (2000=1, based on UAH)		9.9	11.1	12.4	13.5	14.5	15.6	16.6	17.1
Exchange rate	UAH/EUR	33.5	35.5	30.5	28.3	27.9	27.7	27.4	27.2
World market prices									
Wheat	USD/t	211.7	213.1	224.0	233.2	236.9	239.9	242.9	244.4
Barley	USD/t	194.1	189.3	201.2	209.5	213.6	218.6	223.6	226.1
Corn	USD/t	163.0	165.9	175.9	182.2	186.7	192.3	198.2	201.2

The end of the Table 1.1

1	2	3	4	5	6	7	8	9	10
Rapeseed seeds	USD/t	408.9	390.8	412.3	411.6	433.0	455.5	479.2	491.6
Rapeseed meal	USD/t	198.0	208.3	227.3	234.9	245.8	256.4	267.5	273.2
Rapeseed oil	USD/t	792.5	810.7	862.2	856.4	870.2	878.6	887.0	891.3
Soya beans	USD/t	370.7	381.1	414.2	416.1	427.3	422.1	416.9	414.4
Soya meal	USD/t	326.8	343.7	375.1	387.6	405.6	423.1	441.4	450.8
Soya oil	USD/t	789.2	807.3	858.6	852.8	866.5	874.9	883.3	887.5
Sunflower seeds	USD/t	379.6	362.8	382.8	382.1	401.9	422.9	444.9	456.3
Sunflower meal	USD/t	193.1	203.1	221.7	229.0	239.7	250.1	260.8	266.4
Sunflower oil	USD/t	773.4	791.2	841.4	835.8	849.2	857.4	865.6	869.8
Steers	EUR/100kg	212.8	202.6	208.2	222.1	237.6	253.6	271.2	280.4
Hogs	EUR/100kg	95.0	100.6	107.8	105.7	105.3	104.6	104.1	103.9
Broilers	EUR/100kg	104.1	106.7	110.5	114.5	117.9	121.1	124.7	126.5
Lamb	EUR/100kg	288.1	298.5	309.9	319.8	329.8	339.2	349.6	355.0
Skimmed milk powder	EUR/100kg	230.2	242.0	254.2	266.8	275.8	284.4	293.9	298.7
Whole milk powder	EUR/100kg	240.5	249.7	261.3	273.5	283.7	293.4	304.2	309.7
Cheese	EUR/100kg	295.9	311.7	327.1	344.7	360.0	375.0	391.4	399.9
Butter	EUR/100kg	256.4	263.6	272.3	286.1	302.4	318.7	336.5	345.8

Starting from 2027, world market prices are own calculations based on the trend and OECD-FAO (2016). The model considers the values of each year from 2017 until 2030. The years displayed are selected for the reasons of convenience of presentation in this report [3].

1.2 Logistic support of agri-food industry

In The Art of War, published in France in 1836, Baron Antonie Henri de Jomini [18] created the word “logistics” and defined it as “Logistics comprises the means and

arrangements which work out the plans of strategy and tactics. Strategy decides where to act; logistics brings the troops to this point." At the time, "strategy" was military strategy and "flows" concerned all goods, from food to weaponry that needed to be transported to, or close to, the battlefield. Today, logistics not only remains a major concern in any military operation, but has also emerged as a major tool in company management. Based on the development, in October 1998 the Council of Supply Chain Management proclaimed the following definition, which asserts that logistics management was solely a part of SCM:

Logistics is a part of the supply chain process which plans, implements and controls an efficient flow of goods and warehousing, services and relevant information from the point of origin to the point of consumption with the objective to meet consumer needs [14].

Zhang and Li [74] defined agri-food supply chain as a network of business enterprises that are related to food, through which the food is "moving" from production to consumption, including the activities of pre-production and consumption. But where in this definition lies the logistics?

There are a number of changes in agri-food industry that initiate a re-orientation of food companies regarding their roles, activities and strategies. For example, demand and supply are no longer restricted to nations or regions but have become international processes. Furthermore, product assortments have expanded significantly and market requirements on product quality, traceability, delivery services and sustainability are still increasing.

The EU's common agricultural policy focuses on quality not quantity. It helps farmers not just to produce food, but also to protect the environment, improve animal welfare and sustain viable rural communities. The main highlights of EU farm policy from 2013 are [25]:

- enabling farmers to: produce enough safe, high-quality food, contribute to a diversified rural economy and care for the environment and their animals to the highest standards;

- supporting consumers to make informed choices about their food, through voluntary EU quality-labelling schemes. These labels – indicating geographic origin, use of traditional ingredients or methods (including organic) – also help make EU farm products competitive on world markets;

- promoting innovation in farming and food processing to increase productivity and reduce environmental impacts;

- encouraging fair trade relations with developing countries – by reducing EU farm export subsidies, which makes it easier for developing countries to sell what they produce.

To react to these changes and challenges, agricultural and food companies are continuously working on innovations by developing and implementing enhanced quality, logistics and information systems. Most literatures on logistics outsourcing discuss the use of traditional logistics services such as transportation and warehousing. However, very little research is done and known about logistics implications for food supply chain networks. So, in spite that the great importance of logistics in industry, business and other branches is generally acknowledged, this problem is not systematically investigated in agriculture [71].

Definition of agricultural logistics.

The developed logistics industry and market system are the important guarantee of modern agriculture. The research on agricultural logistics is of great significance to speeding up the process of agriculture modernization and improving the competition ability of agriculture [51].

The main aim of this article is to find the most appropriate definition of agricultural logistics or to, based on deferent definition in scientific literature, define agricultural logistics based on the existing ones. Searching the existing definition of logistics in agriculture sector as made through browsers EMERALD Management Xtra (EMX); ScienceDirekt; Elsevier; SpringerLink and JSTOR (Journal Storage). We also searched with browsers IEEE Xplore, JSTOR (Journal Storage), and ProQuest Dissertations & Theses.

We prepared Table 1.2 with different definitions from different authors.

Table 1.2 - Existing definitions of Agricultural Logistics

Authors	Definition
1	2
Li, Li, Chen, Li, Li, Qin, Zheng (2012)	Agricultural products logistics refers to moving material objects and related information from producer to consumer physically for meeting customer's needs and achieve the value of agricultural products.
Daoping, Feng, Lei (2012)	The logistics of food crops is a special type of logistics of agricultural products. The production, circulation and sales of food crops matters to state strategic reserve.
Liping (2009)	Agricultural products logistics is a branch of the logistics industry, refers to physical flows of physical entities and related information from producer to consumer that satisfy consumer demand, including agricultural production, acquisition, transportation, storage, loading and unloading, handling, packaging, distribution processing, distribution, and information activities.
Yao, Cui, Ying, Wei (2009)	Agriculture products logistics dynamic alliance provided a suitable mode for agriculture products logistics.
Zhang, Wang (2011)	Agricultural Products Logistics is one important part of economic behavior, which is to create value and surplus value with the purpose of the act. Modern agricultural products logistics is to use modern science and technology to service in modern society.
Xu (2011)	Based on the understanding of modern logistics, modern agricultural logistics can be defined as: an integrated industrial activities of integrated operation and management relying on advanced computer networks and information technology, integrating the use of modern transport and storage facilities, through a large number of business information instructions, engaged in agricultural transportation, storage, processing, handling, packaging and distribution processing, distribution and information processing. The aim is to optimize the distribution channels of agricultural products, reduce operating costs of agriculture-related enterprises in full range, and provide faster and better service to consumers of agricultural products.
Li, Zhou, Wang (2012)	Taking agricultural products as the core, the agricultural products logistics refers to the organic combination of the entity flowing from producer to receiver and the involving technology, organization, management and other basic functions. It consists of a series of links, such as agricultural production, purchase, transport, storage, loading and unloading, handling, packaging, distribution, circulation processing, information activities, and etc. and realizing agricultural product appreciation and organization objectives in the process.
Wang (2012)	Agricultural products logistics is a branch of the logistics industry, refers to physical flows of physical entities and related information from producer to consumer that satisfy consumer demand, including agricultural production, acquisition, transportation, storage, loading and unloading, handling, packaging, distribution processing, distribution, and information activities. Development objectives of agricultural products logistics is to increase value-added of agricultural products, save distribution costs, improve circulation efficiency and reduce unnecessary losses, to some extent avoid market risks
Gan, Zhu, Zhang (2011)	It is defined agricultural product logistics is the economic activity from agricultural product producer to the consumers in order to satisfy customers' demands, including the links such as agricultural product production, purchasing, transportation, storage, loading and unloading, handling, package, processing, distribution and information processing.

End of the Table 1.2

1	2
Tan, (2012)	Logistics in agriculture are activities associated within the process itself, to improve the quality of agricultural products. The logistical process is improving and ensuring the quality of agricultural products, reducing logistics costs, an optimal allocation of resources, promote the welfare and protection of the environment, strives for the development of agricultural product logistics in the direction of green logistics.
Federico (2011)	Logistics plays a central role in modern agricultural production. The predominance of the logic of commodity trading, expressed by the standardization and international regulation of production, has been promoting the deepening of the territorial division of labor, leading to regional agricultural specialization. The enlargement of the agricultural productive spatial circuits has integrated the flows on a global scale, calling for ever further--reaching logistics in the linking up of the stages spatially separate from production.
Shufeng, Liya, Wei (2010)	Modern agriculture logistics should have 12 functional elements of procurement, supply, storage, transportation, loading and unloading, sorting, packaging, distribution, distribution processing, marketing, recycling, and information control; the task of modern agriculture logistics management should not only put foot on solving to lower the logistics cost, and lessen and avoid the logistics operating risks, but also research how to promote all of function elements to comprehensively play the integrated effects to create plentiful "3rd party profit" of logistics enterprises, and become the source of power of the village lowering agricultural production cost raising agricultural economic benefit promoting the peasants to raise the income and push forward modern agricultural economic development

The authors of the definitions that we have given in the table indicate that logistics in agriculture is an economic activity that caters to the optimal, continuous flow in the process, from the producer of an agricultural product to the final consumer. Logistics in agriculture is an effective and efficient system that ensures a smooth and successful process of production of agricultural products. The aim of logistics in agriculture is in increasing production of agricultural products to care for its continuous operation, optimize the cost of production, storage, transport and distribution, increase value-added agricultural products and satisfy consumer.

Our search strategy started with reviewing theoretical bases of logistics. With extensive search on internet databases we found more scientific journals that were based on the topic of logistics in agriculture. Next step was exploring the concept of logistics in agriculture. From each journal we signed out different definitions of logistics in agriculture writing them down in orderly fashion. The result was a broad range of definitions and keywords which appeared in each definition.

After exploring the concept of logistics in agriculture we can assume, that the understanding ant the meaning of logistics in agriculture is not so different than basic meaning of logistics. Like there is no unified definition of logistics we cannot speak of unified definition of logistics in agriculture.

Like Delfmann and others [19] which have defined logistics as a scientific discipline we came out with this definition of the term:

Logistics in agriculture is a discipline which analyses and models division-of-labor economic systems as time-based and location-based flows of agricultural objects (above all goods and people) in agricultural networks, supplying recommendations for action on the design and implementation of these agricultural networks. Logistics in agriculture tries to configure, organize, control or regulate different agricultural networks and flows with the aim of paving the way for progress in the balanced achievement of economic, ecological and social objectives. The particular approach of logistics is that it interprets economic processes as flows of goods, information, people, assets and other objects in agricultural networks.

Logistics identifies, describes and analyses these networks and flows of objects from a multi perspectival viewpoint and creates a foundation for the organization of these networks and flows geared towards economic, ecological and social goals.

In the formation of the logistics system in the agricultural sector of modern Ukraine purely market institutions for the coordination of relationships such as contracts, agreements, arrangements, schedules of deliveries of products between enterprises, coordinated transportation routes, etc. are of crucial significance. At this level, logistics by using economic leverage has the ability to self-development.

Market institutions and economic interests unite participants of the agroindustrial integration into a single logistic chain. However, the creation of such logistics chain is a long-term process and we are of the opinion that government policies can act as a catalyst for the creation of such logistic chains. Macro level requires state regulation mechanisms for the sustainable use of limited natural resources and socio-economic development of territories.

As a part of the agroindustrial complex there are the following subsystems:

- natural resources;

- agricultural production;

- production of capital goods for agriculture;

- processing, laying-in, storage of agricultural products;

- production infrastructure (road facilities, transport organizations, communications, etc.);

- market infrastructure (food markets, stock exchanges, banks, leasing companies);

- social infrastructure (housing and public utilities infrastructure, organization of education, public health service, culture, sports, trade);

- scientific support;

- staff training, retraining and professional development.

And the logistics system must link all the subsystems in a single chain for the effective functioning and interaction.

Figure 1.1 shows the general scheme of the logistics system of agriculture. The institutional environment creates the necessary arrangements for the operation of the logistics system.

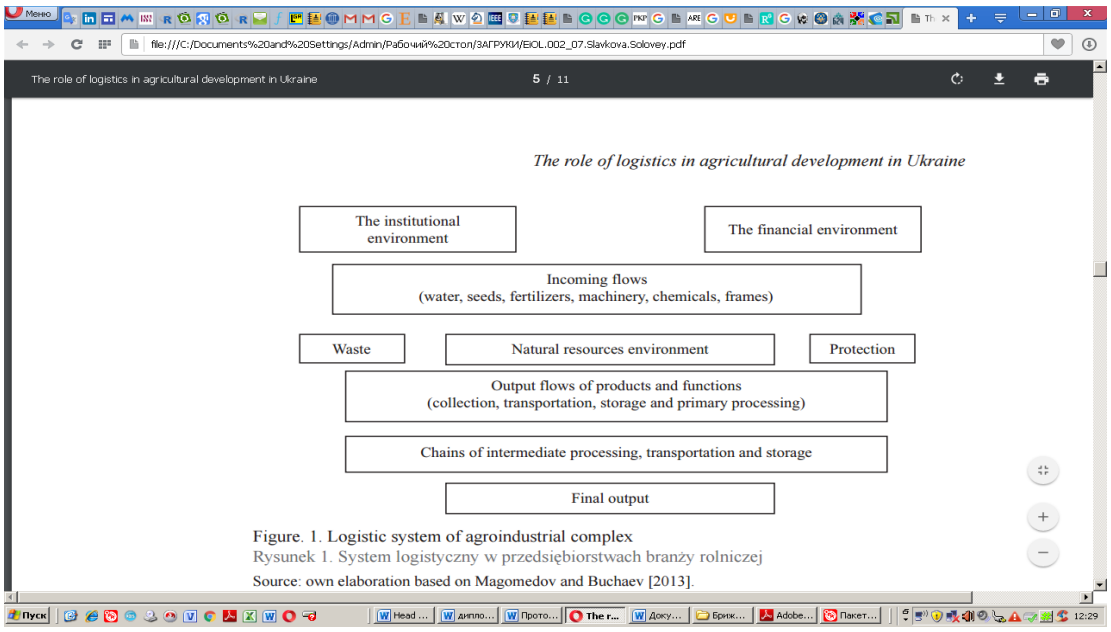


Figure 1.1 - Logistic system of agroindustrial complex

The financial environment generates cash flows that encourage land use and other branches of agroindustrial complex, together with the institutional ones they generate material and labor input flows into the agri-food complex.

In the system of logistics one of the functions most important for modern agricultural enterprises is the function of the formation of agricultural relations with suppliers, which should be based on the integration ties.

For Ukraine, the agricultural sector is of particular importance. Approximately 31.2% of the population lives in rural areas; and agroindustrial complex development to a large extent determines the state of the entire economy and well-being of one third of the population.

The share of agricultural sector accounts for about 11.8% of gross value added by type of economic activity, financial results before taxation 20,529.53 million UAH, employment in agricultural sector 17.1 and 8.6% capital investment concentrated in agriculture.

In recent years, the average circulation costs of capital goods with respect to their value increased (excluding delivery from supply bases to agricultural companies) to 20-25%, in remote regions to 60–80% or more. It causes the growth of the share of the costs of resources shipment in the total costs of agricultural products production. In the EU countries the use of logistics methods allows to reduce the level of distribution costs by 20%, commodity supplies by 30–70%, reduce inventory turnover time by 20–50%.

Before the agro-industrial complex in the direction of the development of logistics systems there is much tension around the issue of technological equipment upgrading, production modernization and introduction of modern packaging and packing material, construction of the necessary storage facilities and distribution centers, as well as the use of the effective means of products transporting through the logistics chain. Material flows of agricultural production must comply with the material and technical supply flows of agriculture. Therefore, the state support of agriculture and the development of agricultural market infrastructure are important.

1.3 Transport as an important factor for an agro-enterprise's success

The story of an adequate farm management begins and ends with efficient and properly managed transport. Transport takes a very important place in every industry, including agriculture.

In order to produce food, farmers need certain resources, such as seed, fertilizers, pesticides, packaging materials, and many others. Precisely because of that, transport is an essential aspect of crop production that enables delivery of agricultural resources to a farmer.

Furthermore, transport is a burning component of post-harvest crop management. After all, every harvested crop needs to be transported, either directly from the field to the market, or to the packing house and storage.

Transport is a farm practice common to every farmer. However, regarding its purpose, it can be classified into two categories:

1. Traditional; manual method of transport, used on every farm, usually includes very short distances (for instance, the transition from the field to the storage that is located on the farm).

2. Mechanized and advanced transport; includes longer distances that require the use of certain means of transport.

Traditional and simple, or mechanized and advanced, transport is an essential component in every crop production. Properly managed transport is efficient in delivering farm resources and harvested crops as fast as possible. When considered as the final practice of delivering the crops to the market, transport is responsible for the preservation of crop yield and quality. Besides that, when it's economically managed, transport will give plenty of space for reducing total production cost.

Access to essential transport infrastructure and services is crucial for agricultural development all over the world as it strengthens market competitiveness and fosters efficient and inclusive agricultural value chains at local and global levels.

Transport infrastructure matters for all actors along the value chain. But for small-scale producers, who tend to be geographically dispersed, the lack of good quality infrastructure and efficient transport can be a particularly large obstacle, making it difficult for them to obtain essential inputs and get their crops to markets. When small-scale producers do have access to transport services, the cost is often very high, limiting their competitiveness and ability to participate in agricultural value chains.

Competition among transport operators plays a critical part in determining transport prices. Low levels of competition tend to increase transport prices, which are among the largest transactions' costs in agriculture. A recent study suggests that imperfect competition accounts for 35% of national transport costs in Central America.1 Small producers in rural areas tend to be more vulnerable to uncompetitive market structures. According to the World Bank's World Development Report 2008: Agriculture for Development, inadequate transport infrastructure and services in rural areas push up marketing costs, undermining both local markets and exports [70].

Development policies have focused mainly on investments to improve transport infrastructure. But the reduced costs of using improved infrastructure will only be enjoyed by consumers and producers if transport services are competitive. Government intervention to increase competition can be an effective way of reducing trade costs. For example, Mexico opened its trucking industry to competition in the late 1980s, and saw road transport prices drop by 23% in real terms within 5 years. In Eastern Europe, the elimination of rate and route controls led to the entry of new trucking operators that offered competitive prices and innovative logistics services.4 In the Lao People's Democratic Republic, the elimination of the trucking cartel and the restrictions on foreign truckers' transporting goods back out of the country led to a reduction of 30% in logistics costs [57].

Transport regulation is justified to tackle market failures such as congestion, pollution and safety issues, which can lead to unfair competition. Because roads are generally a public good, users do not perceive the cost of the addition of another vehicle, and this can lead to road (freight) transport fleets exceeding optimal levels. Some governments do not sufficiently address these market failures, while others often

go beyond what is necessary and proportionate in doing so. Quantitative restrictions, such as caps on the number of trucking firms, can unduly restrict competition by impeding the entry and development of new firms. Price controls may increase business risks for trucking companies. And excessive licensing requirements and costs discriminate against new entrants, small and medium-size firms and foreign trucking companies.

Smart regulation—regulation that strikes the right balance in ensuring proper enforcement of essential safety and quality control rules while avoiding excessive regulatory burdens in the trucking sector—can lead to both better transport services and lower costs [54]. Appropriate weight (axle-load) regulations help prevent road deterioration, enhance safety, reduce road maintenance costs and create a level playing field among providers of transport services. Appropriate professional standards and certification support an effective logistics sector. And removing unnecessary quantitative limits or excessive licensing requirements in the trucking sector can facilitate trade.

Transporting agricultural goods data measure policy and regulatory constraints in trucking services and road infrastructure limitations that can potentially affect the development of commercial agriculture. The data focus on road transport because this is the mode used for most agricultural and food products in developed and developing countries alike; in the United States, 70% of agricultural freight is transported by road, and in Africa, 70-90% is [10]. Even cargo conveyed by air, sea or rail travels part of the way by road.

Five subtopics have been designated, as follows:

1. Licensing requirements to operate a trucking company. These data measure the requirements and procedures to start and operate a domestic trucking company (see Data notes for case study details), including the time and cost involved. The data focus on the major regulatory requirements for obtaining and renewing necessary licenses or permits to transport agricultural goods.

2. Pricing and freight allocation. These data measure regulatory or other interventions by the government or transport associations in determining how prices are set and how freight is allocated.

3. Axle-load regulation. These data focus on national axle-load and vehicle total mass limits as well as their enforcement through weighing stations and associated fines.

4. Mutual recognition of standards and foreign trucking competition. These data focus on bilateral or regional agreements between countries and their most important neighboring agricultural trading partners. The data measure whether there is mutual recognition of relevant standards for trucking companies, as well as restrictions on cross-border trucking services, including import, transit, cabotage, backhauling and triangular rights. These rights refer to foreign trucking companies' ability to transport goods into a country (import), through the country (transit), between 2 points within the country (cabotage), back from the country (backhauling) and from the country into a third country (triangular rights).

5. Monitoring of road access, density and quality. These data record the existence of government indicators on road access (such as the share of the population living within a certain distance of a road), road network density, and road quality.

Free competition in transport services, though broadly agreed on in principle,19 is far from being fully implemented in practice. Among the 10 pilot countries, all except the Philippines (the only island country in the group) allow foreign companies to transport goods into the country, but only Spain and Ukraine allow internal cabotage. These two countries also grant foreign companies all other transport rights measured by the transporting agricultural goods data (import, transit, backhauling and triangular rights) (table 1.3).

Table 1.3 - Transporting goods from the country's largest neighboring agricultural trading partner [22]

Country	Types of transport rights granted to foreign companies				
	Import	Backhauling	Transit	Triangular	Cabotage
Ethiopia	■ ■				
Guatemala	■	■	■	■	
Morocco	■	■	■	■	
Mozambique	■ ■ ■				
Nepal	■ ■				
Rwanda	■	■	■	■	
Spain	■	■	■	■	■
Uganda	■	■	■	■	
Ukraine	■	■	■	■	■

Blanks = no such transport rights are granted.

Except for Morocco, Mozambique and Ukraine, all countries use the International Roughness Index, which tracks the percentage of trunk roads in poor, fair or good quality. In Guatemala and Uganda, the percentage of the national/ trunk roads in poor condition is as high as 33 percent and 23 percent, respectively, while in Spain, it is about 5 percent.

1.4 Chapter summary

Agriculture and food supply chain is specific and complex area with important responsibilities. There are two main demands:

1. Maintaining food quality and safety along the supply chain.

2. Reducing logistics cost.

The concept of Agricultural and Food Logistics is slowly emerging as one of the important types of logistics to reach the requirements for maintaining quality of raw materials for food products or even to perform value adding activities in the food supply chain.

In relation to globalization of marketing system, it is a vital for all stakeholders to reduce logistics cost in order to increase their economic competitiveness. Therefore, development of effective and efficient Agricultural and Food Logistics is necessary and essential.

CHAPTER 2
ANALISIS OF TRANSPORT PROCESSES AND INFORMATION SUPPORT OF «PETROMIKHAILIVSKE PRIVATE JOINT-STOCK COMPANY»

2.1 General information about the company

Name: PRIVATE JOINT STOCK COMPANY "PETROMYKHAYLIVSKE" (PJSC "Petromikhaylivske").

Company Number - 00488800.

Date of state registration - June 10, 1997. Date of recording: 27.06.2006. Record number: 1 083 120 0000 000346.

The state registration body is the Vilnia District State Administration of the Zaporizhia Region

Date of the last registration action - 06.05.2016 - new version of the Charter of Association according to the decision of the general meeting of shareholders, Minutes №11 of 01.04.2016. Record number: 1 083 105 0018 000346 [105].

Types of activity, NACE codes:

01.11 Growing of cereals (except rice), leguminous crops and oil seeds (main);

01.13 Growing of vegetables and melons, roots and tubers;

01.24 Growing of fruits;

01.46 Breeding of pigs;

1.61 Ancillary activities in crop production;

10.41 Manufacture of oils and animal fats;

10.61 Manufacture of flour and cereal products;

46.21 Wholesale of grain, unmanufactured tobacco, seeds and animal feeds.

The average number of employees (persons) is 128.

Registered Address: 70015, Zaporizhia region, Vilnia district, village Petro-Mykhailivka, street Peace, h. 89.

Company management structure.

For the period from 01.01.2019 on 31.12.2019, the following corporate governance bodies functioned in the joint-stock company:

- General meeting of shareholders,
- Supervisory Board,
- CEO.

The General Director is the sole executive body of the Company, which manages the current activities of the Company. The General Director is accountable to the General Meeting and the Supervisory Board, organizes the implementation of their decisions. The competence of the General Director includes the resolution of all issues related to the management of the current activities of the Company, except for issues that fall within the exclusive competence of the General Meeting and the Supervisory Board.

The Supervisory Board is a body of the Company that protects the rights of the Company's shareholders in the period between the general meeting and within the competence defined by the Articles of Association and the Law, controls and regulates the activities of the Management Board. The competence of the Supervisory Board includes the resolution of issues provided by law, the charter, as well as referred to the Supervisory Board by the General Meeting.

There are no outstanding convictions for mercenary and official crimes. Information on the amount of remuneration paid, is not indicated, as the issuer is a private joint stock company that did not carry out public (open) placement of securities. Total work experience 43 years. Positions held by the person during the last five years: Deputy Chairman of the Management Board, Chairman of the Supervisory Board. He does not hold positions at any other enterprises.

Two members of the supervisory board. If it is impossible for the Chairman of the Supervisory Board to perform his powers, one of the members of the Supervisory Board shall exercise his powers by decision of the Chairman of the Supervisory Board. The powers of an official as a member of the Supervisory Board include representing

the interests of shareholders in the interval between the general meeting of shareholders by making decisions at meetings of the Supervisory Board.

He has no outstanding convictions for mercenary and official crimes. Information on the amount of remuneration paid, is not indicated, as the issuer is a private joint stock company that did not carry out public (open) placement of securities. Total work experience 31 years. Positions held by the person during the last five years: chairman of the public organization, member of the supervisory board. He does not hold positions at any other enterprises.

Chief Accountant. The powers of the official as the chief accountant include the organization and maintenance of accounting in the Company.

He has no outstanding convictions for mercenary and official crimes. Information on the amount of remuneration paid, is not indicated. Total work experience 20 years. Positions held by the person during the last five years: chief accountant. He does not hold positions at any other enterprises. There were no changes in the personnel of the official in the reporting period.

Fixed assets of the company

The company's fixed assets include buildings and structures, machinery and equipment, vehicles, etc. (Table 2.1).

Table 2.1 - The cost of fixed assets of the company (thousand UAH)

Name of fixed assets	Fixed assets, total	
	At the beginning of the period	At the end of the period
Buildings and structures	4698	4350
Machinery and equipment	7357	19856
Vehicles	116	138
Others	82	240
Total	12253	24584

Terms of use of fixed assets (by main groups):

- Buildings and structures - 15-30 years;
- Machinery and equipment - 5 years;
- Vehicles - 7 years;
- Tools - 5-15 years;

- Other - 3-10 years.

Conditions for the use of fixed assets are satisfactory for all groups. Fixed assets for all groups are used for their intended purpose. The initial cost of fixed assets at the beginning of the reporting period is 41794 thousand UAH, at the end of the reporting period is 55036 thousand UAH. The degree of depreciation of fixed assets at the beginning of the reporting period is 71%, at the end of the reporting period is 55%. Disposal rate of fixed assets - 0.01. The ratio of fixed assets - 0.25. The amount of accrued depreciation at the beginning of the reporting period is 29541 thousand UAH, at the end of the reporting period is 30452 thousand UAH. There are no restrictions on the use of the issuer's property.

Significant changes in the value of fixed assets during the reporting period are caused by the acquisition of fixed assets. During the reporting period received fixed assets in the amount of 13759 thousand UAH, namely:

- buildings, structures and transmitting devices - 150 thousand UAH;
- machinery and equipment - 13,405 thousand UAH;
- vehicles - 30 thousand UAH;
- tools, devices, inventory - 174 thousand UAH.

Information on the volume of production and sales of major products

The company deals with a wide range of products. the volume of production in tons and in monetary equivalent was analyzed (Figs. 2.1, 2.2).

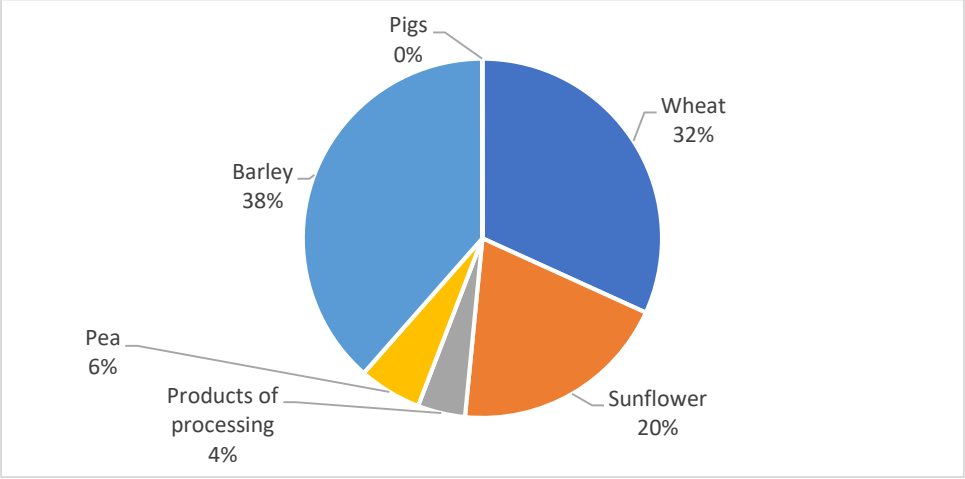


Figure 2.1 - Annual production in kind (t)

You can see that the main number of products is wheat and barley (70% together). Sunflower accounts for 20% of production, peas - 6%, other products have less than 5%.

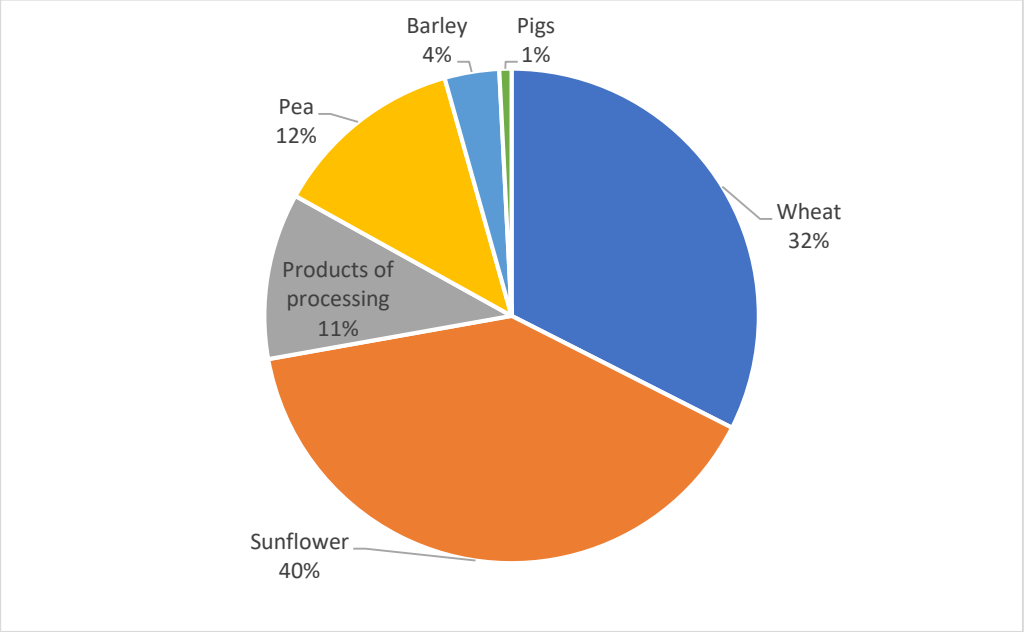


Figure 2.2 - Annual production in cash (million UAH)

The situation with the cost of grown products differs from production volumes in tons. Thus, the largest share of money comes from sunflowers (40%), in the second place - wheat (32%), in the third - peas (12%).

It is known that the company sells its products throughout the year. Warehouse capacity allows you to successfully store the crop and sell it as needed at market prices. Sales volumes by months of the year are analyzed (Fig. 2.3). You can see a certain seasonality with two peaks - in May and November.

The shares of different parts of the cost of production in total costs are estimated. It was found that the greatest share of the cost is made up of direct material costs (almost 60%) and other direct costs including land rent (up to 30%) (Fig. 2.4).

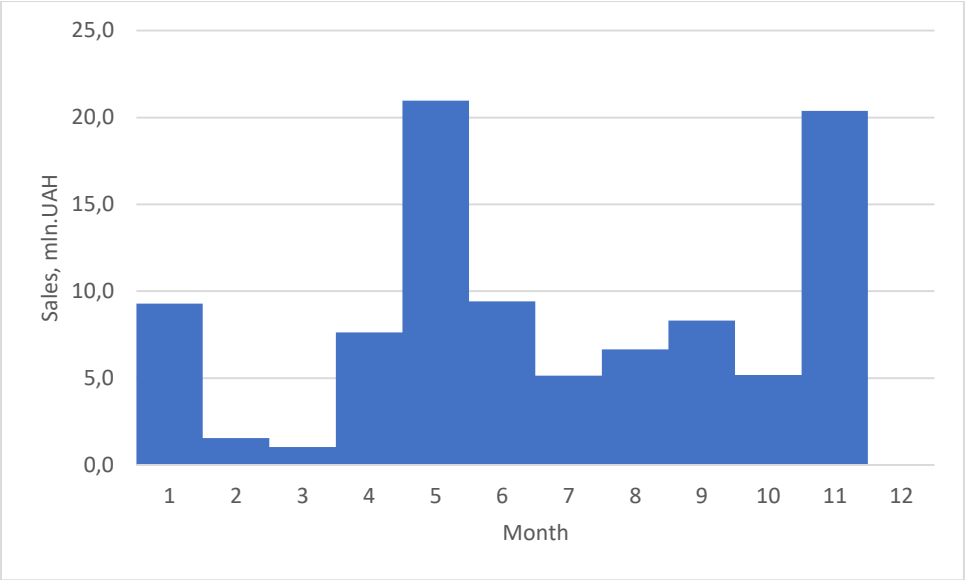


Figure 2.3 - Seasonality of the company's sales

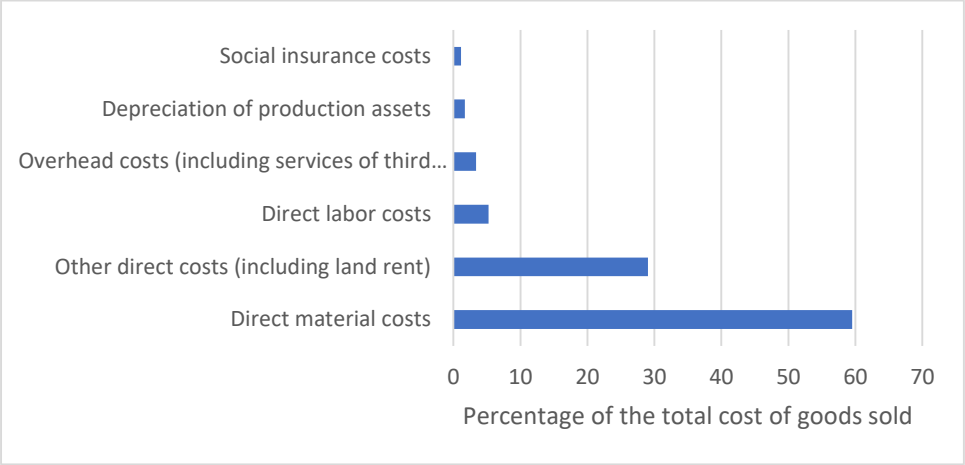


Figure 2.4 - Information on the cost of goods sold

The main suppliers and consumers of the company.

The value of the Company's assets as of 01.01.2019 is 72,560 thousand UAH. The amount of the minimum transaction, which is subject to audit procedures, is 7,256 thousand UAH. Due to the director's limitation on the amount, the following transactions were performed (Table 2.2).

Table 2.2 - Execution of significant transactions in 2019

Counterparty	Contract	Protocol	Total, UAH
1	2	3	4
Suppliers			
Agrosphere LLC	№3208-П from 24.05.19 №220ОХ from 24.05.19	№6 from 23.05.2019.	1941987 1104365
Acquired plant protection products	№10798АТ from 07.07.19	№11 from 10.07.2019.	6633280
LLC “Agrotek”	№ОМ -022/2019 from 26.05.19	№7 from 26.05.2019.	4245119
Purchase of a seeder	№179 from 02.07.19	№13 from 02.08.2019.	8043000
Bison Import LLC	№11590АТ from 20.11.2019	№32 from 21.11.2019.	6411790
Purchase of seeds	№443 from 28.11.2019.	№36 from 30.11.19.	3978000
Customers			
FLP Zubach VM Sales of sunflower	№2704 from 27.04.2019.	№4 from 28.04.19.	21325233
LLC "Profit-POINT" Sales of wheat	№ГЮ /40/05/19 from 30.05.19.	№13 from 02.08.2019.	7350000
Ridna Khata LLC Sales of wheat	№69-3 from 01.06.19.	№13 from 02.08.2019.	3740796
Blagoveshchensky Zernoprodukt LLC Sales of wheat	№1830-1 from 08.09.19.	№21 from 09.09.2019.	3600000
Blagoveshchensky Zernoprodukt LLC Sales of wheat	№2171-1 from 20.09.19.	№22 from 20.09.2019.	2160000
JSC "CARGILL" Implementation of sunflower	№CVP06090 from 20.10.19.	№27 from 20.10.2019.	6300000
DPII "Santrade" Sales of sunflower	№60214720 from 06.11.2019.	№30 from 07.11.2019.	4232000
PJSC "Pologi Oil Extraction Plant" Sales of sunflower	№384147 from 08.11.19.	№31 from 08.11.2019.	5275500
JSC "CARGILL" Sales of sunflower	№CVP07214 from 20.10.19.	№33 from 21.11.2019.	4300000
JSC "CARGILL" Sales of sunflower	№CVP07513 from 20.10.19.	№35 from 30.11.2019.	6450000

We can conclude that the Company complied with the requirements of the law on the implementation of significant transactions, the rules of the charter and the decisions of the participants.

2.2 Analysis of financial and economic indicators of the company

During 2019, the company received income in the amount of 106013 thousand UAH, including:

- net income from sales of products (goods, works, services) in the amount of 105513 thousand UAH (excluding VAT in the amount of 21103 thousand UAH);

- other operating income in the amount of 19 thousand UAH (income from the sale of other current assets - 9 thousand UAH;

- received fines, penalties, penalties - 4 thousand UAH;

- income from the write-off of accounts payable - 3 thousand UAH;

- other income - 3 thousand UAH;

- other financial income in the amount of UAH 481 thousand. (dividends received - UAH 368 thousand;

- interest received on deposits - UAH 83 thousand;

- insurance payments for accidents - 30 thousand UAH.

In 2019, the company's expenses amounted to 83723 thousand UAH, including:

- cost of goods sold (goods, works, services) - 71318 thousand UAH;

- administrative expenses - 6726 thousand UAH;

- selling expenses - 3595 thousand UAH;

- other operating expenses - 2084 thousand UAH (costs of determining the initial value of bioactive assets - 284 thousand UAH;

- cost of sold inventories - 9 thousand UAH;

- shortages and losses from damage to property - 241 thousand UAH;

- other expenses - 5 thousand UAH. And other operating expenses on account 949 - 1545 thousand UAH, including: depreciation of non-productive health facilities, charitable assistance, wages, theft, irreversible waste, natural losses, difference in weight, shrinkage, disposal, etc.

Thus, as a result of financial and economic activities for 2019, the company received a net profit of 22290 thousand UAH, which is determined in accordance with the requirements of current legislation of Ukraine.

During 2019, there were receipts from the sale of services in the amount of 117777 thousand UAH:

- targeted funding - 49 thousand UAH,
- receipt of advances - 213 thousand UAH,
- receipts from interest on balances - 87 thousand UAH,
- from debtors - 4 thousand UAH,
- from insurance premiums - 30 thousand UAH,
- other receipts - 163 thousand UAH.

Spent on payment for goods, works, services - 54009 thousand UAH:

- employees - 6931 thousand UAH,
- deductions for social activities - 1982 thousand UAH,
- mandatory payments - 15928 thousand UAH,
- for payment of VAT liabilities - 8,591 thousand UAH,
- to pay liabilities from other taxes and fees - 7337 thousand UAH,
- expenses for payment of return of advances - 1755 thousand UAH;
- for payment of target contributions - 142 thousand UAH,
- to pay obligations under insurance contracts - 165 thousand UAH,
- other expenses - 8705 thousand UAH.

Thus, the net movement of funds from operating activities - receipts in the amount of 28706 thousand UAH. There were receipts from received dividends - 368 thousand UAH, expenses for acquisition of non-current assets - 16609 thousand UAH. Net cash flow from investing activities - expenditure in the amount of 16241 thousand UAH. During the reporting period, loans in the amount of 1308 thousand UAH were repaid, dividends were paid - 15242 thousand UAH. Net cash flow from financing activities - expense in the amount of 16550 thousand UAH. Net cash flow for the reporting period - an expense in the amount of 4085 thousand UAH. The balance of funds at the end of

2019 amounted to 2542 thousand UAH, which is 4085 thousand UAH less compared to the beginning of the year.

During 2019, the balance sheet currency increased by 350 thousand UAH and the end of the year amounted to 72910 thousand UAH. At the end of the year, non-current assets increased by 12350 thousand UAH due to the acquisition of fixed assets, current assets decreased by 12000 thousand UAH.

The value of intangible assets at cost is 20 thousand UAH, fixed assets - 55036 thousand UAH. Depreciation ratio of fixed assets - 0.55, intangible assets - 0.4.

Unfinished construction is 1509 thousand UAH (purchased and not put into operation objects of fixed assets and other non-current assets).

Long-term financial investments amount to 127000 UAH. Compared to the previous year, the share of inventories in current assets increased by 8972 thousand UAH, work in progress by 916 thousand UAH, goods by 4 thousand UAH, the share of inventories decreased by 20279 thousand UAH, finished goods by 30171 thousand UAH, biological assets by 211 thousand UAH, the amount of receivables for goods, works, services decreased by 784 thousand UAH, the debt on issued advances increased by 12010 thousand UAH and at the end of the year amounted to 13436 thousand UAH, the debt to the budget increased by 59 thousand UAH, other current receivables increased by 3100 thousand UAH, cash in the national currency amounted to 2542 thousand UAH.

Other current assets at the end of the year amount to 12000 UAH.

The authorized capital did not change during 2019.

The company's equity increased in total by 4922 thousand UAH in 2019, the capital in revaluations remained unchanged and amounted to 14372 thousand UAH, the reserve capital remained unchanged and amounted to 1444 thousand UAH.

The amount of retained earnings at the end of 2019 in the company is 39572 thousand UAH, which increased compared to the previous year by 4922 thousand UAH.

There are no long-term liabilities as of 31.12.2019.

Current liabilities for 2019 amount to 11324 thousand UAH, including:

- debt for goods, works, services - 7200 thousand UAH,

- arrears on calculations with the budget - 1750 thousand UAH;

- arrears on current payments of wages to employees - 24 thousand UAH;

- accounts payable on received advances - 288 thousand UAH,

- arrears on settlements with participants - 302 thousand UAH,

- other current debt - 1760 thousand UAH.

There are no overdue debts and debts to banks.

Table 2.3 - Analysis of the financial condition of PJSC "PETROMYKHAYLIVSKE"

Indicators	As of 31.12.2018	As of 31.12.2019	Notes
1. Liquidity ratio: 1.1. Total (coverage ratio)	3,69	4,12	Theoretical value 1.0 - 2.0. The ratio indicates that the company is independent of borrowed funds when financing real assets.
1.2. Current liquidity	0,78	1,83	The theoretical value of the coefficient is 0.6 - 0.8. This ratio indicates a sufficient level of liquidity of the company.
1.3. Absolute liquidity	0,42	0,23	The optimal value of the coefficient is 0.2 - 0.3. The ratio indicates sufficient funds in the event of the need to pay current debts immediately.
2. Solvency ratio (autonomy)	0,78	0,85	The theoretical value of the coefficient is not less than 0.5.
3. Funding ratio	0,28	0,18	Characterizes the independence of the enterprise from external leases. The theoretical value of the coefficient is not more than 1.
4. Asset efficiency ratio	0,24	0,31	Shows the payback period of the return on investment in property.
5. Coefficient of efficiency of use of own means (capital)	0,31	0,36	Theoretical value is not less than 0.4.
6. Profitability ratio 6.1. Return on assets	0,29	0,31	The theoretical value is greater than 0.
6.2. Return on equity ratio	0,36	0,38	The theoretical value is greater than 0.

Conclusion - PJSC "PETROMYKHAYLIVSKE" as of December 31, 2019 is solvent and liquid, has a stable financial condition.

2.3 Analysis of transport processes of the company

The company has a large fleet of vehicles (Table 2.4). The total number of units is 138. Almost all transport processes are carried out by the company's own forces, without the involvement of external carriers and freight forwarders.

Table 2.4 - Types of vehicles of the company and their number

Vehicle type	Quantity	Vehicle type	Quantity
1	2	3	4
Auto Hyundai Sonata	1	Auto Ford Mondeo Trend	1
Auto ВАЗ-212140	2	Trailer ГКБ-8350	1
Auto ГАЗ -53Б	1	Trailer ГКБ-8527	1
Auto ГАЗ-31029	1	Trailer ГКБ-8535	1
Auto ГАЗ-52-05	3	Trailer ОДАЗ-3885	2
Auto ГАЗ-53-12	7	Fuel level sensor F 1	6
Auto ГАЗ-САЗ-3503	1	Majara	16
Auto ГАЗ-САЗ-3507	10	Semi-majara	1
Auto ЗАЗ-110307 12	1	Tipper semitrailer Bodex	2
Auto ЗАЗ-968М	1	Tipper semitrailer "Кайзер"	1
Auto ЗИЛ-130	1	Tipper semitrailer GRAS	1
Auto ЗИЛ-431410	2	Tipper semitrailer JANMIL NWIS 222	4
Auto ЗИЛ-ММЗ-4502	1	Tank trailer KLEASER	1
Auto ЗИЛ-ММЗ-554М	1	Motion control device G 4	6
Auto ИЖ-271501	2	Trailer	1
Auto КамАЗ-5320	5	Trailer 3 ПТС-12	1
Auto КАМАЗ-55102	1	Trailer ГКБ-887	2
Auto КамАЗ-5511	1	Trailer ПТС- 40	2
Auto Ланос	1	Trailer 1 ПТС- 2Н	1
Auto Славута 11030740	1	Trailer 1 ПТС-9	1

The end of the Table 2.4

1	2	3	4
Auto Славута АР	1	Trailer 1ПТС-2Н 1	3
Auto Таврия-Нова	2	Trailer 2 ПТС-4	18
Auto УАЗ-31512	1	Trailer ПСЕ-12,5	1
Auto УАЗ-3303	1	Trailer ПСЕ-20	1
Auto УАЗ-39121	2	Car tractor DAF	3
Bus ГАЗ-5312	1	Car tractor	3
Bus ГАЗ	1	Tent	1
Auto Камаз 1159	1	Trap - trolley	1
Auto Камаз 35911	1	Total	138

In 2018, work began on equipping trucks of distribution system with monitoring systems:

- DAF AP3791BM (17772);
- DAF 3792 (12232);
- DAF AP3790BM (17774);
- DAF AP6077BM (17773);
- DAF AP1866BM (17775);
- DAF AP4439BO (17776).

In 2018 5 cars were equipped, and in 2019 - all 6.

Trucks that transport from the field to elevators and to other enterprises, as well as deliver production from elevators to companies-buyers, are now all equipped with the control system of the company "Globus". Now they all have fuel monitoring sensors and motion monitoring sensors.

The GLOBUS Transport Control System is an innovative technical solution for on-line monitoring of vehicles and fuel control. The system is based on GPS / GPRS technology. It includes the necessary set of hardware and software, and also allows you to connect a wide range of additional equipment. SKT "Globus" allows to solve the widest range of tasks for the management and control of the use of transport.

The costs of spare parts and fuel for 2017-2019 in the dynamics were analyzed to see the effect of installing a control system on tracks.

Costs of spare parts (turnover of account 207):

- for 2017 - 1435800 UAH (4896 units);

- for 2018 - 753100 UAH (2951 units);

- for 2019 - 628500 UAH (2856 units) (Table 2.3).

Table 2.5 - Dynamics of spare parts, 2017-2019

Spare parts	Year						
	2017	2018	difference 2017-2018	difference 2017-2018, %	2019	difference 2018-2019	difference 2018-2019, %
Costs of spare parts, thousand UAH	1435,8	753,1	682,7	47,5	628,5	124,7	16,5
Number of spare parts, units	4896	2951	1945	39,7	2856	95	3,22

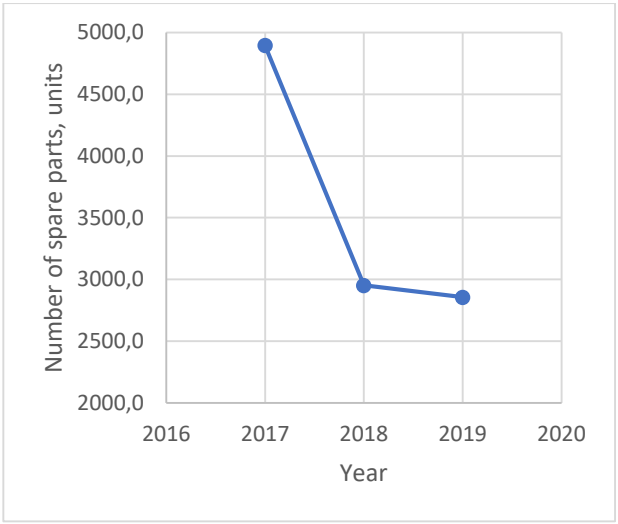
As we can see after the introduction of fuel control and monitoring sensors for 6 vehicles transporting the company's products, costs of spare parts decreased amost twice, while the number of purchased spare parts decreased by almost 50%. In 2019, the equipment was completed by a monitoring system up to 100%, which led to a drop in costs by 16,5% more, while the number of purchased spare parts decreased by 3,22% in comparison with 2018. Traffic volumes have fallen by 20% since 2017. Thus, we can assume that the reduction in the cost of spare parts is about 20%. It should be added that these results are impressive, given that the fleet of vehicles transporting the company's products not new, respectively, the number of breakdowns increases from year to year.

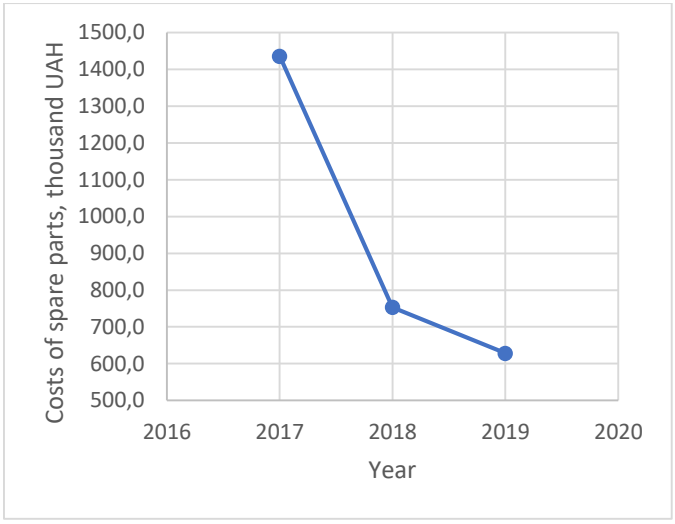
Diesel fuel (turnover of account 203):

- for 2017 - 2340904 UAH (146306 l), average 16,0 UAH/l;

- for 2018 - 2201579 UAH (108365 l), average 18,6 UAH/l;

- for 2019 - 2059028 UAH (102803 l), average 19,1 UAH/l (Fig. 2.6).





a) b)

Figure 2.5 - Dynamics of spare parts, 2017-2019: a) - units, b) - thousand UAH

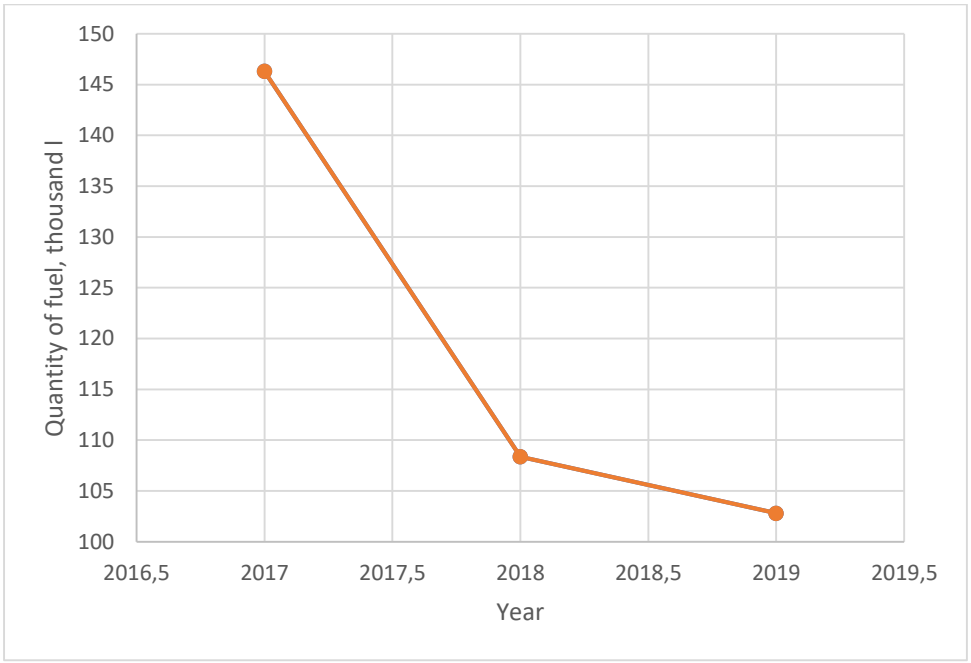


Figure 2.6 - Dynamics of quantity of fuel

You can see that the amount of fuel consumed fell by 43 thousand liters from 2017 to 2019. Considering that the volume of transport work did not decrease and the vehicles were not replaced by more economical ones, this is a significant difference. With an average fuel cost of 19.1 UAH / l in 2019, the difference in fuel consumption amounted to almost 830 thousand UAH, which is a significant saving (30% in

comparison with 2017). Traffic volumes have fallen by 20% since 2017. Thus, we can assume that the reduction in the cost of fuel is about 10%.

2.4 Chapter 2 summary

The object of the master thesis is PrAT "Novopetryvsky", which is a powerful agro-holding located in the Zaporizhzhya region. The company is engaged in the expression of various field crops, stone fruits, and livestock rearing.

Analysis of the financial results of the company allows us to talk about its stable position, which is confirmed by the conclusions of independent auditors.

The company's activity continues year-round, but sales have two peaks - in May and November. Accordingly, it is these two periods that are the most difficult for the company's logistics system.

The company's fleet of vehicles contains almost one and a half hundred units. The costs of transport logistics are significant and form a big part of the cost of production. Given the increasing competition in the agricultural market, it was decided to analyze the transport component of logistics costs and find ways to reduce them.

It was found that at the moment all vehicles that distribute the company's products are equipped with transport monitoring systems, which positively affects the company's costs. A significant reduction in the cost of spare parts and fuel was found, which proves the rationality of implementing a monitoring system.

CHAPTER 3
PROPOSITION ABOUT INFORMATION SUPPORT FOR THE CONTROL OF THE AGRO-ENTERPRISE TRANSPORT PROCESSES

3.1 Agriculture GPS Guidance Monitoring and Management System

A modern agricultural enterprise, as a rule, owns a large fleet of vehicles, including harvesting equipment, freight transport, tankers, etc. It is here that theft, misuse of the means of production and violation of technical requirements for the performance of a particular work often take place. But the cost of fuel and maintenance of equipment is a significant part of the total costs of the enterprise. To reduce costs in conditions of high competition and unstable prices for agricultural products, satellite monitoring systems for agricultural equipment are actively used today. Monitoring in agriculture is somewhat different from traditional monitoring of transport.

The AgroControl module. Module features:

- monitoring the movement of equipment online;
- the ability to keep track of farmland (naming, counting areas, designating the field contours on the map, entering them into the general list) and field work (visual display of the path of the machine-tractor unit during processing);
- identification of the driver who is currently driving the vehicle;
- identification of agricultural implements;
- optimization of field logistics - calculation of field travels and distances between map objects;
- generation of reports both on the operation of the vehicle, and on sites and treatments;
- crop rotation data - crop year, cultivated crop, yield, etc.;
- storage of the history of all agricultural operations carried out in each field;

- control of the fuel level in the fuel tanks of the vehicle, as well as fuel consumption for a certain period of time;

- printout of a field map (Fig. 3.1) [67].

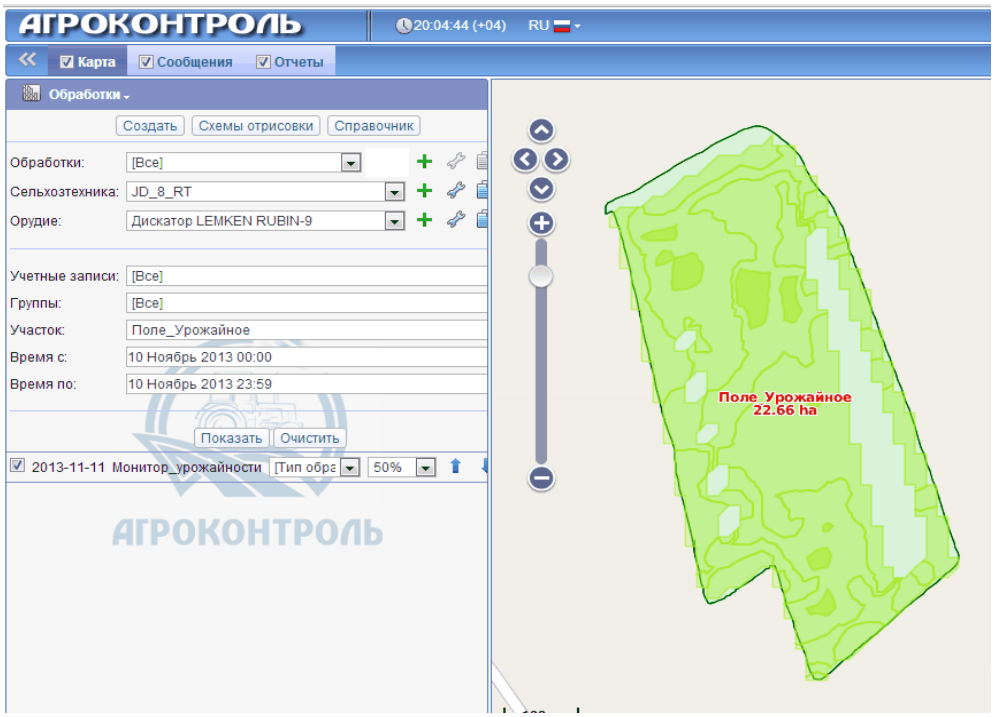


Figure 3.1 - Field map [67]

With the help of modern data processing mechanisms, the AgroControl module allows you to describe in detail and save the features of the field sections on which work was carried out in the recent past.

This technology allows you to display the track of an agricultural machine with an accuracy of 2.5 cm2, which is of no small importance in agriculture and allows you to extract the maximum benefit from farmland due to precise technological operations. For more than five years, the AgroControl module has been showing excellent results and continues to develop, offering new opportunities to users (Fig. 3.2, 3.3).

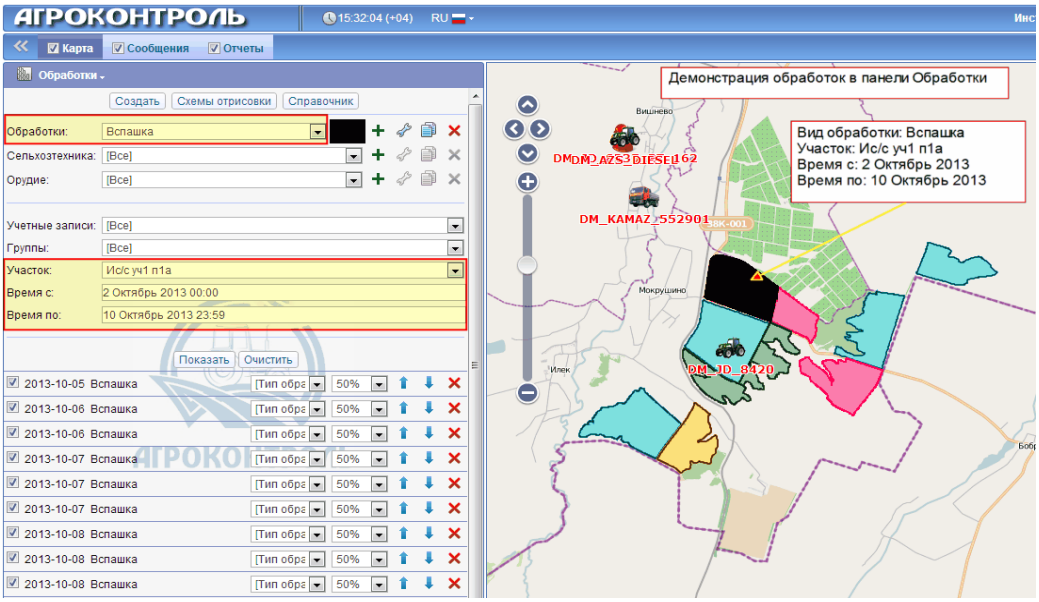


Figure 3.2 - Field processing demonstration and processing panel [67]

Figure 3.3 - Yield map [67]

GIS "Globe Agro".

GIS "Globe Agro" was originally developed as an addition to the system. Today it is a full-fledged specialized solution that integrates the work of the agronomic, engineering and economic departments of an agricultural enterprise.

What tasks does the system solve?

1. Creation of electronic field maps in the monitoring system (determination of field boundaries, yield mapping, monitoring the operation of equipment within the field boundaries, etc.). Cartography:

- raster maps;

- Google Map;

- WMS server [108].

2. Monitoring the progress and quality of the work as part of the sowing and harvesting campaign (compliance with the speed characteristics of vehicles, calculating the volume of work performed, determining the type of technological operation, etc.)

3. Safety and security (vehicle identification, information about the exact place of unloading of the crop, etc.)

GIS "Globe Agro" allows you to keep a log of field work and accounting for technological operations, as well as build reports on field work. Reports on field work are built in any sections for any time intervals. They can be grouped by culture, branch, driver, technological operation, etc:

- waybill (start / end of movement, mileage, travel time / downtime) (Fig. 3.5);

- reports on fuel (refueling / plums; consumption for the period, l / ha);

- "checkpoints" (tasks of visits, time and order of visits);

- "control Zones (Fields)" (time spent in the Zone (Fields), mileage in the Zone (Fields), departure from the Zone (Fields));

- processing area;

- driver control (personification; driving time; driving style) [67].

The system has the ability to automatically or manually generate waybills. The waybill displays the main indicators of the work shift: the beginning and end of the shift, driver, mileage, fuel consumption, engine hours, etc. Waybills can be exported to 1C. Data export:

- CSV format;

- 1C.

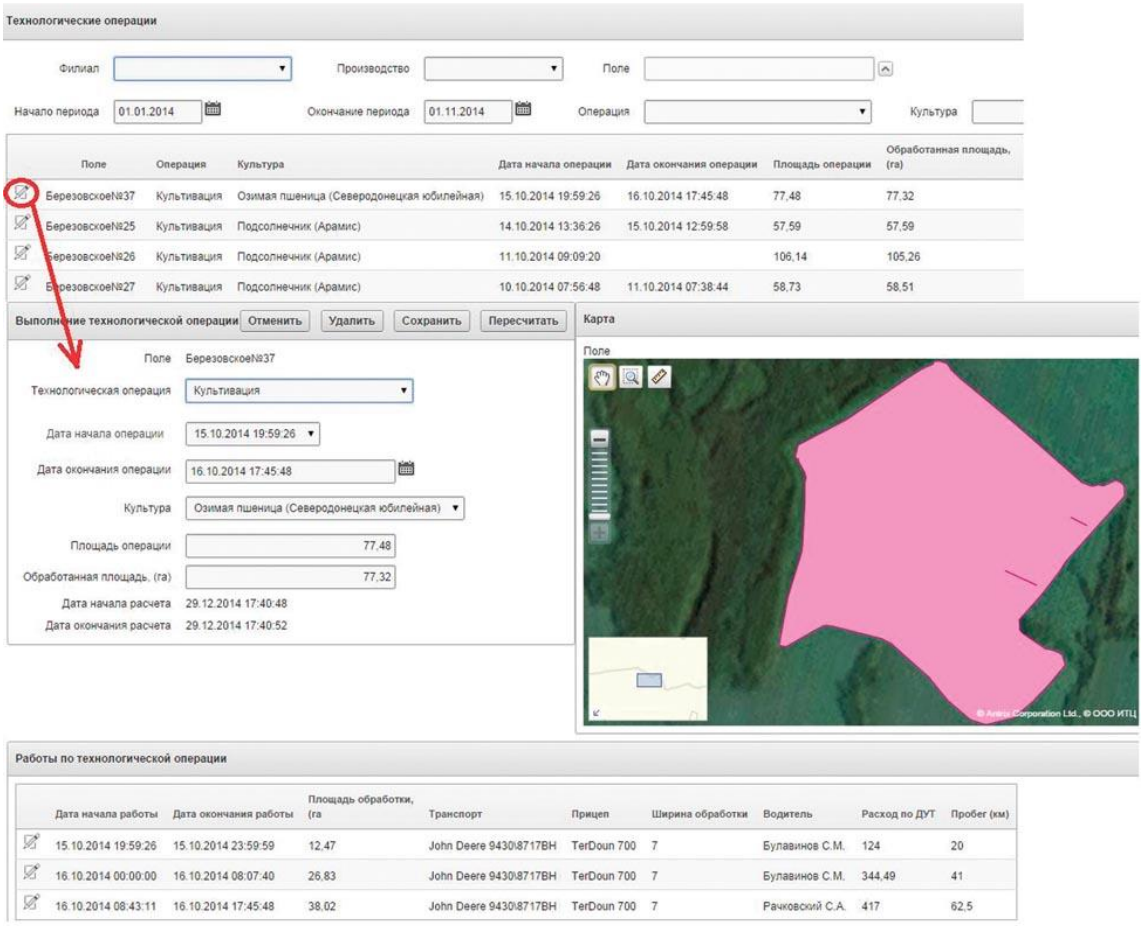


Figure 3.4 - Map of technological operation

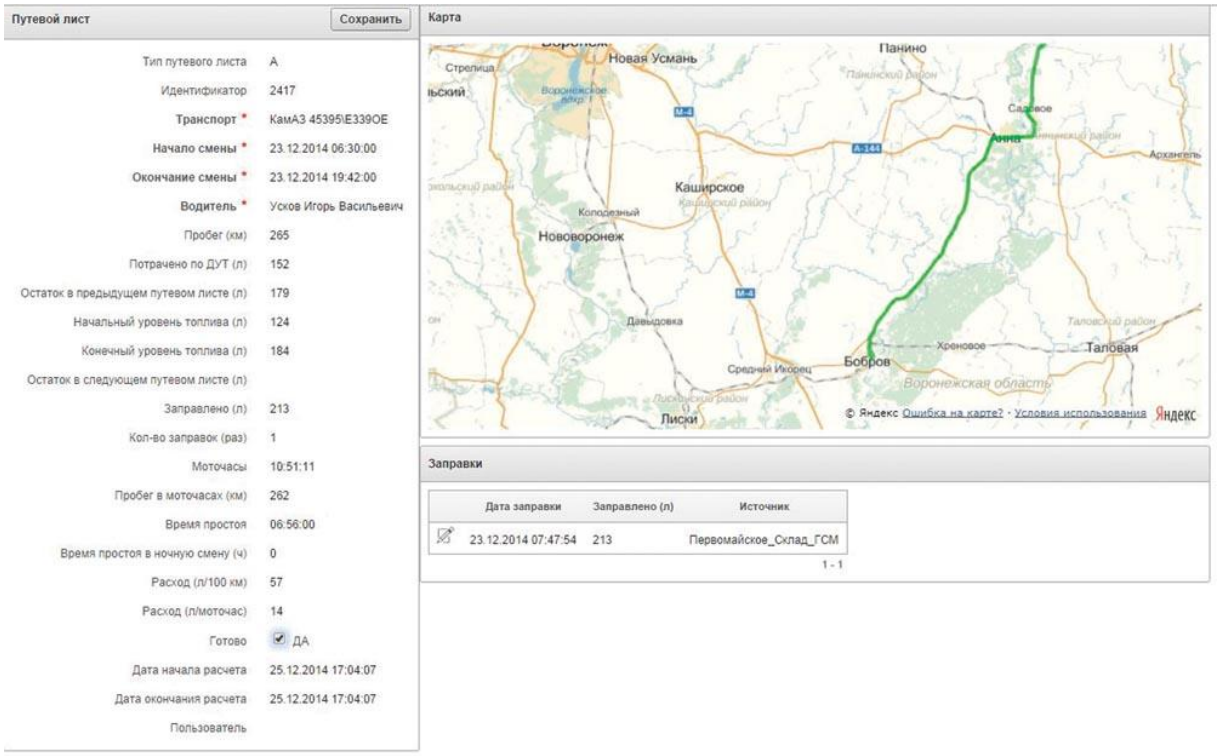


Figure 3.5 - Map of waybill

To control fuel consumption, GIS "Globe Agro" allows you to keep track of the movement of fuel with the formation of a report on refueling equipment with a comparison of the source of refueling. The report displays information about the date and time of refueling, the driver, the amount of fuel refueled in the tank of the equipment, as well as the amount of fuel issued from the fuel and lubricants warehouse. To assess the capabilities of the system in business, the company is ready upon request to provide customers with a lightweight version of the software for free.

The composition of "Globus Agro":

- Globus-Agro-Server Internet server;
- on-line management platform;
- Globus Client client program;
- WEB-client;
- G6 motion recorder.

Additional equipment:

- opening / closing sensors;
- hour meter;
- driver's key;
- attachment sensor;
- fuel sensors;
- CAN bus controller;
- "Alarm" button;
- RFID;
- TouchMemory;
- Audio kit [108].

3.2 Efficiency of implementation of transport monitoring system

The implementation of a transport monitoring system at any enterprise, regardless of the size of the fleet, increases the efficiency of use and reduces operating costs of the entire enterprise.

It is necessary to study the effectiveness of the implementation of transport monitoring at the enterprise comprehensively. It is not enough to simply install GPS trackers or GPS terminals on vehicles and connect the transport monitoring system. Competent administrative management of this fleet is also needed, which allows for a transport monitoring system.

To manage the fleet, the transport monitoring system provides reports that allow you to assess the efficiency of transport use and make the necessary management decisions. Based on a systematic approach and experience in solving such problems, the transport monitoring system provides all the necessary information for the efficient use of the existing fleet and, accordingly, increase the return on investment and business efficiency in general.

Saving operating costs, improving the quality of transport services and the volume of traffic, improving the safety of transportation, achieved through a transport monitoring system - all this significantly saves the company's costs and increases its profitability. However, I always want to answer a specific question: "How much will I save from the introduction of transport monitoring at my company?" Below we will consider each component of improving the efficiency of vehicle use.

The main opportunities for effective use of the fleet with the use of transport monitoring system:

- fuel consumption control;
- exclusion of fuel drain;
- exclusion of misuse of transport;
- the exclusion of the attribution of the distance traveled;
- monitoring of deviation from the set route;

- monitoring of observance of a speed mode;

- reduction of downtime;

- the ability to inform the driver about traffic jams and detour routes;

- rational drawing up of routes [102].

Reducing fuel consumption and mileage monitoring when using a vehicle monitoring system saves money not only on lower fuel and lubricant costs, but also on vehicle maintenance costs and spare parts. If the mileage is controlled by the monitoring system, it decreases, which leads to an increase in the period between the next maintenance, which, accordingly, reduces the cost of operating the fleet.

The exclusion of a false increase in the distance traveled and the monitoring of cases of deviation from the route have a very strong impact on the actual fuel consumption associated with the task. At consistent and competent administration of these parameters the general operational expenses of the enterprise for motor transport considerably decrease.

Control of a speed mode by means of system of monitoring of transport allows to achieve reduction of a fuel consumption to 20% only on this parameter. There are many factors that directly or indirectly affect fuel consumption. One of the essential factors is the driving style. Intensive acceleration and braking, driving at high speed leads not only to increased fuel consumption, but also to increased tire wear and maximum loads on the engine, transmission and brake system of the car. In addition, by controlling the speed mode, the monitoring system allows to reduce accidents. To do this, each recorded case of deviation from the specified parameters must be recorded by the transport monitoring system. In the future, on the basis of a set of cases, a decision is made to punish or reward the driver.

Factors for improving the quality of transport services and the volume of traffic:

1. Rational routes.

2. Monitoring the current location of the vehicle online to make operational decisions.

3. Prompt response to both working and abnormal situations.

4. Improving staff discipline [102].

The transport monitoring system, thanks to the visual graphical display of vehicles and traffic statistics, taking into account both road conditions (eg, congestion) and other factors, allows you to rationally compile traffic routes and respond quickly to emerging situations, both regular and non-regular.

The system allows to exchange messages between the dispatcher and the vehicle that essentially increases efficiency of the decision of the set tasks and increases safety of both the driver, and freight. Using SMS messages, the monitoring system manager can transmit to the driver all the necessary information, starting from the task and ending with the traffic situation. Messages can be sent directly to the driver's phone via the SMS gateway of the monitoring system, it does not require additional equipment costs and reduces the cost of voice and SMS traffic of the control center.

Personnel, realizing that all their actions are controlled by the transport monitoring system, are forced to "self-discipline." The transport monitoring system implemented at the enterprise significantly reduces losses associated with misuse of the vehicle (unaccounted for trips) and deviations from the specified routes, which, in turn, leads to a reduction in operating costs described above. Moreover, since the transport monitoring system allows to control refueling and draining of fuel, the staff no longer resorts to this type of "additional earnings".

Factors for improving transportation safety:

1. Control of movement and places of stops of the vehicle.

2. Operational control of deviation of transport from the set routes.

3. Control of an entrance of the vehicle in the set geo-zones and an exit from them.

4. Monitoring of a condition of systems of the vehicle and freight due to connections of additional sensors.

5. Control of working hours, including continuous driving by one driver.

6. The driver may at any time send an alarm message.

7. Possibility of two-way communication with the driver.

The issue of safety is one of the top priorities, as it leads to disability or even tragic consequences. The monitoring system allows to increase safety of both the driver, and freight. The safety of the vehicle primarily depends on the discipline of personnel and

compliance with established rules of transportation. Requirements such as refueling only at inspected filling stations, stops and overnight stays in protected areas are mandatory to ensure safety and must be strictly implemented in the company's fleet, as the transport monitoring system allows you to control parking and refueling.

When installing additional sensors, the monitoring system will check the condition of the vehicle and cargo systems. For example, by installing a temperature sensor in the refrigeration compartment of the body, you can monitor the temperature and, if necessary, receive timely notification of changes in this parameter below or above the control value, which, in turn, reduces the risk of damage from damage. Transport monitoring allows you to install and use additional sensors for any car system: accurate fuel sensors, opening or closing the doors, trunk, body overturning, opening the filling and drain necks, temperature control and much more.

Control of driving time and prevention of extreme fatigue of the driver repeatedly reduces possibility of road accident and, by that, reduces risk of loss both of the vehicle, and loss of freight. Well, the possible consequences for the life and health of the driver result in incredible image, moral and material losses for the company.

The presence of the "SOS button" function in the tracker and monitoring system allows to inform the dispatcher about an abnormal situation, which significantly increases security. When the alarm button is pressed, the SOS message is immediately transmitted to the transport monitoring system, and a dispatcher is immediately connected to resolve the situation, who can activate the voice monitoring function, listen to the situation inside the car, contact the driver and decide to go to the company, also on the call of emergency services, road patrol officers and law enforcement agencies. The dispatcher of the transport monitoring system has complete information about the exact current location of the vehicle and the place of pressing the SOS button by the driver or forwarder.

After reading all the above, you can estimate the possible effectiveness of the implementation of the transport monitoring system. Such parameters as risks of loss of cargo, car, business reputation and lost profits, etc. you can evaluate only an individual company, taking into account the specifics of its activities. Even without taking into

account the above, the effectiveness of the implementation of the transport monitoring system on only one criterion of "reduction of fuel costs" more than justifies the cost of its implementation and the installation of GPS trackers on vehicles. According to the statistics of users of the monitoring system, fuel consumption with competent and consistent monitoring of transport is reduced by 25-30%. Using these figures, it is possible to determine the benefits of implementing a monitoring system. But there are many other factors that affect the success of the transport unit, which are most directly affected by transport monitoring and discussed above.

When installing the system on field equipment, the economic feasibility of this solution should be assessed. The best way is to make project calculations taking into account investment and annual costs. Comparison of the benefits and costs of the project, taking into account the term of depreciation and the amount of discounting will determine both the rationality of the innovation and the payback period.

Now we calculate the economic efficiency of the project of implementation of transport monitoring system to the field transport of the organization. For this purpose, we apply the standard method for calculating the magnitude of discounted income (PV) and net present value (NPV - Net Present Value or NAV (net discounted income)), respectively, calculated by the formulas

$$PV = \sum_{t=1}^{T} \frac{P_t}{(1+r)^t} \tag{3.1}$$

$$NPV = \sum_{t=1}^{T} \frac{P_t}{(1+r)^t} - IC \tag{3.2}$$

where Pt is the difference between future input and output cash flows in period t (net income);

IC - initial investment costs (outgoing cash flow);

T - the investment horizon (the number of periods over which cash flows occur);

t - the corresponding period;

r - the discount rate (usually the rate on bank deposits with a similar term T is chosen in its quality).

Payback period:

$$PP = \frac{IC}{P} \tag{3.3}$$

where P is the annual savings of the project, UAH.

The calculation of project performance indicators is given in Table. 3.1.

Calculation procedure:

1. Installation of equipment. As it is planned to equip 10 vehicles working in fields with means of monitoring, and the equipment on 1 vehicle costs 6000 UAH, the general investment expenses will make 10 * 6000 = 60,000 UAH.

2. Staff training and support costs. This article includes the cost of familiarizing staff with the new system of evaluation of transport, with the capabilities of the system. These are presentations, trainings, polls. Together with labor costs, the amount is UAH 30,000.

3. Equipment of the monitoring dispatcher's workplace. Currently, the company does not have a separate staff unit that would be responsible for monitoring vehicles. However, when the number of equipped cars is increased to 16 units, an additional person should be involved to perform these functions. Workplace equipment - table, chair, cabinet, computer, printer, etc. The total one-time costs for the workplace of the new dispatcher are UAH 65,000.

Table 3.1 - Calculation of economic efficiency of the transport monitoring system

Cost / profit part	Year of the project				
	1	2	3	4	5
Installation of equipment for 10 vehicles	60000	0	0	0	0
Staff training and labor costs for all additional operations	30000	0	0	0	0
Equipment of the workplace of the monitoring dispatcher	65000	0	0	0	0
Subscription fee	0	1440	1440	1440	1440
Salary of the monitoring dispatcher	0	180000	180000	180000	180000
Reduce fuel costs	0	279444	279444	279444	279444
Reduction of costs for spare parts and repairs	0	287160	287160	287160	287160
Total benefits from the project	-155000	385164	385164	385164	385164
PV, UAH	-155000	320970,38	267475,32	222896,10	185746,75
NPV, UAH	842088,55				
PP, year	0,40				

4. Subscription fee. According to Globus tariffs, the subscription fee is UAH 120 per month for all cars. Accordingly, the annual costs will amount to UAH 1,440.

5. Salary of the monitoring dispatcher. The salary is planned at the level of UAH 15,000, therefore, the annual salary costs will amount to UAH 180,000.

6. Reducing fuel costs. Since in Chapter 2 it was found that the reduction in fuel costs is about 10%, the fuel consumption in liters 146300 should be multiplied by the average cost of fuel in 2019 (19.1 UAH / l), and from this amount to take 10%: 146306 * 0.1 * 19.1 = UAH 279,444.

7. Reducing the cost of spare parts. Since in Chapter 2 it was obtained that the reduction in the cost of spare parts is about 20%, we obtain the following amount of savings: 1435800 * 0.2 = 385164 UAH.

8. The total benefits of the project are calculated as the difference between the total costs and the total savings of each year.

9. PV, NPV, PP are calculated by formulas (3.1) - (3.3).

As you can see, the cost of installing a vehicle monitoring system will pay off in less than five months, which proves the feasibility of such a proposal.

3.3 Chapter 3 summary

Information technology has long entered our lives. They facilitate the management, analysis, accounting, optimization of many processes occurring in enterprises. In this paper, we consider an example of the successful application of controlling vehicles of an agricultural enterprise using a navigation system.

In agriculture, as in no other industry, there is a huge amount of non-production costs and risks. Especially a lot of costs and frauds arise during the operation of agricultural machinery. Its inappropriate use and theft of fuel. And the remoteness of the business owner only increases the likelihood of various abuses.

Since part of the vehicle fleet of the enterprise has already been equipped with monitoring tools, the thesis contains reasonable proposals to equip field equipment with a control system. A detailed analysis of the costs and benefits allows us to talk about a fairly quick payback period of the project - about 5 months. The main savings in logistics costs are achieved by reducing the cost of spare parts and repairs and fuel costs.

CONCLUSIONS AND RECOMMENDATIONS

Agriculture and food supply chain is specific and complex area with important responsibilities. There are two main demands:

1. Maintaining food quality and safety along the supply chain.

2. Reducing logistics cost.

The concept of Agricultural and Food Logistics is slowly emerging as one of the important types of logistics to reach the requirements for maintaining quality of raw materials for food products or even to perform value adding activities in the food supply chain.

In relation to globalization of marketing system, it is a vital for all stakeholders to reduce logistics cost in order to increase their economic competitiveness. Therefore, development of effective and efficient Agricultural and Food Logistics is necessary and essential.

The object of the research is transport processes of “Petromikhailivske” Private Joint-Stock Company. Main types of activity: growing of cereals vegetables and melons, roots and tubers, fruits; breeding of pigs; ancillary activities in crop production; manufacture of oils and animal fats; manufacture of flour and cereal products; wholesale of grain, unmanufactured tobacco, seeds and animal feeds.

Structure of the companie’s top-management:

- General meeting of shareholders,
- Supervisory Board,
- CEO.

The average number of employees - 128.

The initial cost of fixed assets at the beginning of the reporting period is 41794 thousand UAH, at the end of the reporting period is 55036 thousand UAH. The degree of depreciation of fixed assets at the beginning of the reporting period is 71%, at the end of the reporting period is 55%. Disposal rate of fixed assets - 0.01. The ratio of fixed assets - 0.25. The amount of accrued depreciation at the beginning of the

reporting period is 29541 thousand UAH, at the end of the reporting period is 30452 thousand UAH. There are no restrictions on the use of the issuer's property.

The main number of products is wheat and barley (70% together). Sunflower accounts for 20% of production, peas - 6%, other products have less than 5%.

The situation with the cost of grown products differs from production volumes in tons. Thus, the largest share of money comes from sunflowers (40%), in the second place - wheat (32%), in the third - peas (12%).

It is known that the company sells its products throughout the year. Warehouse capacity allows you to successfully store the crop and sell it as needed at market prices. Sales volumes by months of the year are analyzed. There are seasonality with two peaks - in May and November.

The shares of different parts of the cost of production in total costs are estimated. It was found that the greatest share of the cost is made up of direct material costs (almost 60%) and other direct costs including land rent (up to 30%).

According to the analysis of financial and economic indicators of the company PJSC "PETROMYKHAYLIVSKE" is solvent and liquid, has a stable financial condition.

The company has a large fleet of vehicles - 138. Almost all transport processes are carried out by the company's own forces, without the involvement of external carriers and freight forwarders.

Trucks that transport from the field to elevators and to other enterprises, as well as deliver production from elevators to companies-buyers, are now all equipped with the control system of the company "Globus". Now they all have fuel monitoring sensors and motion monitoring sensors.

The costs of spare parts and fuel for 2017-2019 in the dynamics were analyzed to see the effect of installing a control system on tracks. After the implementation of fuel control and monitoring sensors for 6 vehicles transporting the company's products, costs of spare parts decreased amost twice, while the number of purchased spare parts decreased by almost 50%. In 2019, the equipment was completed by a monitoring system up to 100%, which led to a drop in costs by 16,5% more, while the number of

purchased spare parts decreased by 3,22% in comparison with 2018. Traffic volumes have fallen by 20% since 2017. Thus, we can assume that the reduction in the cost of spare parts is about 20%. It should be added that these results are impressive, given that the fleet of vehicles transporting the company's products not new, respectively, the number of breakdowns increases from year to year.

The number of fuel consumed fell by 43 thousand liters from 2017 to 2019. Considering that the volume of transport work did not decrease and the vehicles were not replaced by more economical ones, this is a significant difference. With an average fuel cost of 19.1 UAH / l in 2019, the difference in fuel consumption amounted to almost 830 thousand UAH, which is a significant saving (30% in comparison with 2017). Traffic volumes have fallen by 20% since 2017. Thus, we can assume that the reduction in the cost of fuel is about 10%.

The implementation of a transport monitoring system at any enterprise, regardless of the size of the fleet, increases the efficiency of use and reduces operating costs of the entire enterprise.

It is necessary to study the effectiveness of the implementation of transport monitoring at the enterprise comprehensively. It is not enough to simply install GPS trackers or GPS terminals on vehicles and connect the transport monitoring system. Competent administrative management of this fleet is also needed, which allows for a transport monitoring system.

The main opportunities for effective use of the fleet with the use of transport monitoring system:

- fuel consumption control;
- exclusion of fuel drain;
- exclusion of misuse of transport;
- the exclusion of the attribution of the distance traveled;
- monitoring of deviation from the set route;
- monitoring of observance of a speed mode;
- reduction of downtime;
- the ability to inform the driver about traffic jams and detour routes;

- rational drawing up of routes.

We calculated the economic efficiency of the project of implementation of transport monitoring system to the field transport of the organization. For this purpose, the standard method for calculating the magnitude of discounted income (PV) and net present value (NPV) has been applied. Calculation shows that the cost of installing a vehicle monitoring system will pay off in less than five months, which proves the feasibility of such a proposal.

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Appendix A Balance of the organization

		Коди		
	Дата (рік, місяць, число)	2020	01	01
Підприємство ПРИВАТНЕ АКЦІОНЕРНЕ ТОВАРИСТВО "ПЕТРОМИХАЙЛІВСЬКЕ"	за ЄДРПОУ	00488800		
Територія ЗАПОРІЗЬКА ОБЛАСТЬ	за КОАТУУ	2321586800		
Організаційно-правова форма господарювання ПРИВАТНЕ АКЦІОНЕРНЕ ТОВАРИСТВО	за КОПФГ	111		
Вид економічної діяльності ВИРОЩУВАННЯ ЗЕРНОВИХ КУЛЬТУР (КРІМ РИСУ), БОБОВИХ КУЛЬТУР І НАСІННЯ ОЛІЙНИХ КУЛЬТУР	за КВЕД	01.11		

Середня кількість працівників 128
Одиниця виміру : тис. грн.
Адреса 70015 Запорізька область Вільнянський район село Петро-Михайлівка вул. Миру, будинок 89, т.(061)43-95-5-82

Складено (зробити позначку "v" у відповідній клітинці):	
за положеннями (стандартами) бухгалтерського обліку	V
за міжнародними стандартами фінансової звітності	

Баланс (Звіт про фінансовий стан) на "31" грудня 2019 р.

Форма № 1 Код за ДКУД 1801001

Актив	Код рядка	На початок звітного періоду	На кінець звітного періоду
1	**2**	**3**	**4**
I. Необоротні активи Нематеріальні активи	1000	8	12
первісна вартість	1001	8	20
накопичена амортизація	1002	--	8
Незавершені капітальні інвестиції	1005	1509	1509
Основні засоби	1010	12253	24584
первісна вартість	1011	41794	55036
знос	1012	29541	30452
Інвестиційна нерухомість	1015	--	--
Довгострокові біологічні активи	1020	--	--
Довгострокові фінансові інвестиції: які обліковуються за методом участі в капіталі інших підприємств	1030	--	--
інші фінансові інвестиції	1035	127	127
Довгострокова дебіторська заборгованість	1040	--	--
Відстрочені податкові активи	1045	--	--
Інші необоротні активи	1090	16	31
Усього за розділом I	1095	13913	26263
II. Оборотні активи Запаси	1100	46200	25921
Виробничі запаси	1101	6751	15723
Незавершене виробництво	1102	5034	5950
Готова продукція	1103	34411	4240
Товари	1104	4	8
Поточні біологічні активи	1110	565	354
Дебіторська заборгованість за продукцію, товари, роботи, послуги	1125	1921	1137
Дебіторська заборгованість за розрахунками: за виданими авансами	1130	1426	13436
з бюджетом	1135	52	111
у тому числі з податку на прибуток	1136	--	--
Інша поточна дебіторська заборгованість	1155	34	3134
Поточні фінансові інвестиції	1160	--	--
Гроші та їх еквіваленти	1165	6627	2542
Готівка	1166	13	8
Рахунки в банках	1167	6614	2534
Витрати майбутніх періодів	1170	--	--
Інші оборотні активи	1190	1822	12
Усього за розділом II	1195	58647	46647
III. Необоротні активи, утримувані для продажу, та групи вибуття	1200	--	--
Баланс	1300	72560	72910

Пасив	Код рядка	На початок звітного року	На кінець звітного періоду
1	**2**	**3**	**4**
I. Власний капітал Зареєстрований (пайовий) капітал	1400	6198	6198
Капітал у дооцінках	1405	--	--
Додатковий капітал	1410	14372	14372
Резервний капітал	1415	1444	1444
Нерозподілений прибуток (непокритий збиток)	1420	34650	39572
Неоплачений капітал	1425	--	--
Вилучений капітал	1430	--	--
Усього за розділом I	1495	56664	61586
II. Довгострокові зобов'язання і забезпечення Відстрочені податкові зобов'язання	1500	--	--
Довгострокові кредити банків	1510	--	--
Інші довгострокові зобов'язання	1515	--	--
Довгострокові забезпечення	1520	--	--
Цільове фінансування	1525	--	--
Усього за розділом II	1595	--	--
III. Поточні зобов'язання і забезпечення Короткострокові кредити банків	1600	--	--
Поточна кредиторська заборгованість за: довгостроковими зобов'язаннями	1610	--	--
товари, роботи, послуги	1615	479	7200
розрахунками з бюджетом	1620	1497	1750
у тому числі з податку на прибуток	1621	--	--
розрахунками зі страхування	1625	30	--
розрахунками з оплати праці	1630	250	24
Поточна кредиторська заборгованість за одержаними авансами	1635	10936	288
Поточна кредиторська заборгованість за розрахунками з учасниками	1640	--	302
Поточні забезпечення	1660	--	--
Доходи майбутніх періодів	1665	--	--
Інші поточні зобов'язання	1690	2704	1760
Усього за розділом III	1695	15896	11324
IV. Зобов'язання, пов'язані з необоротними активами, утримуваними для продажу, та групами вибуття	1700	--	--
Баланс	1900	72560	72910

Appendix B Statement of financial results of the organization

	Коди		
Дата (рік, місяць, число)	2020	01	01
за ЄДРПОУ	00488800		

Підприємство ПРИВАТНЕ АКЦІОНЕРНЕ ТОВАРИСТВО "ПЕТРОМИХАЙЛІВСЬКЕ"

Звіт про фінансові результати (Звіт про сукупний дохід)
за 2019 рік

Форма № 2 Код за ДКУД 1801003

I. ФІНАНСОВІ РЕЗУЛЬТАТИ

Стаття	Код рядка	За звітний період	За аналогічний період попереднього року
1	2	3	4
Чистий дохід від реалізації продукції (товарів, робіт, послуг)	2000	105513	49213
Собівартість реалізованої продукції (товарів, робіт, послуг)	2050	(71318)	(26245)
Валовий: прибуток	2090	34195	22968
збиток	2095	(--)	(--)
Інші операційні доходи	2120	19	1420
Дохід від зміни вартості активів, які оцінюються за справедливою вартістю	2121	--	1330
Адміністративні витрати	2130	(6726)	(2678)
Витрати на збут	2150	(3595)	(2936)
Інші операційні витрати	2180	(2084)	(1035)
Фінансовий результат від операційної діяльності: прибуток	2190	21809	17739
збиток	2195	(--)	(--)
Дохід від участі в капіталі	2200	--	--
Інші фінансові доходи	2220	481	9
Інші доходи	2240	--	--
Фінансові витрати	2250	(--)	(380)
Втрати від участі в капіталі	2255	(--)	(--)
Інші витрати	2270	(--)	(--)
Фінансовий результат до оподаткування: прибуток	2290	22290	17368
збиток	2295	(--)	(--)
Витрати (дохід) з податку на прибуток	2300	--	--
Прибуток (збиток) від припиненої діяльності після оподаткування	2305	--	--
Чистий фінансовий результат: прибуток	2350	22290	17368
збиток	2355	(--)	(--)

II. СУКУПНИЙ ДОХІД

Стаття	Код рядка	За звітний період	За аналогічний період попереднього року
1	2	3	4
Дооцінка (уцінка) необоротних активів	2400	--	--
Дооцінка (уцінка) фінансових інструментів	2405	--	--
Накопичені курсові різниці	2410	--	--
Частка іншого сукупного доходу асоційованих та спільних підприємств	2415	--	--
Інший сукупний дохід	2445	--	--
Інший сукупний дохід до оподаткування	2450	--	--
Податок на прибуток, пов'язаний з іншим сукупним доходом	2455	--	--
Інший сукупний дохід після оподаткування	2460	--	--
Сукупний дохід (сума рядків 2350, 2355 та 2460)	2465	22290	17368

III. ЕЛЕМЕНТИ ОПЕРАЦІЙНИХ ВИТРАТ

Назва статті	Код рядка	За звітний період	За аналогічний період попереднього року
1	**2**	**3**	**4**
Матеріальні затрати	2500	14191	13953
Витрати на оплату праці	2505	8418	5366
Відрахування на соціальні заходи	2510	1831	1169
Амортизація	2515	1428	826
Інші операційні витрати	2520	17299	11960
Разом	2550	43167	33274

IV. РОЗРАХУНОК ПОКАЗНИКІВ ПРИБУТКОВОСТІ АКЦІЙ

Назва статті	Код рядка	За звітний період	За аналогічний період попереднього року
1	**2**	**3**	**4**
Середньорічна кількість простих акцій	2600	--	--
Скоригована середньорічна кількість простих акцій	2605	--	--
Чистий прибуток (збиток) на одну просту акцію	2610	--	--
Скоригований чистий прибуток (збиток) на одну просту акцію	2615	--	--
Дивіденди на одну просту акцію	2650	--	--

Appendix C Statement of Cash Flows of the organization

	Коди		
Дата (рік, місяць, число)	2020	01	01
за ЄДРПОУ	00488800		

Підприємство ПРИВАТНЕ АКЦІОНЕРНЕ ТОВАРИСТВО "ПЕТРОМИХАЙЛІВСЬКЕ"

Звіт про рух грошових коштів (за прямим методом) за 2019 рік

Форма № 3 Код за ДКУД 1801004

Стаття	Код рядка	За звітний період	За аналогічний період попереднього року
1	2	3	4
I. Рух коштів у результаті операційної діяльності Надходження від: Реалізації продукції (товарів, робіт, послуг)	3000	117777	65973
Повернення податків і зборів	3005	--	--
у тому числі податку на додану вартість	3006	--	--
Цільового фінансування	3010	49	30
Надходження від отримання субсидій, дотацій	3011	--	30
Надходження від повернення авансів	3020	213	584
Надходження від відсотків за залишками коштів на поточних рахунках	3025	87	9
Надходження від боржників неустойки (штрафів, пені)	3035	4	--
Надходження від страхових премій	3050	30	--
Інші надходження	3095	163	16
Витрачання на оплату: Товарів (робіт, послуг)	3100	(54009)	(38002)
Праці	3105	(6931)	(4305)
Відрахувань на соціальні заходи	3110	(1982)	(1185)
Зобов'язань з податків і зборів	3115	(15928)	(5522)
Зобов'язання з податку на додану вартість	3117	(8591)	(1602)
Зобов'язання з інших податків і зборів	3118	(7337)	(3920)
Витрачання на оплату повернення авансів	3140	(1755)	(6)
Витрачання на оплату цільових внесків	3145	(142)	(--)
Витрачання на оплату зобов'язань за страховими контрактами	3150	(165)	(--)
Інші витрачання	3190	(8705)	(8091)
Чистий рух коштів від операційної діяльності	3195	28706	9501
II. Рух коштів у результаті інвестиційної діяльності Надходження від реалізації: фінансових інвестицій	3200	--	--
необоротних активів	3205	--	--
Надходження від отриманих: відсотків	3215	--	--
дивідендів	3220	368	--
Надходження від деривативів	3225	--	--
Інші надходження	3250	--	--
Витрачання на придбання: фінансових інвестицій	3255	(--)	(--)
необоротних активів	3260	(16609)	(8381)
Виплати за деривативами	3270	(--)	(--)
Інші платежі	3290	(--)	(--)
Чистий рух коштів від інвестиційної діяльності	3295	-16241	-8381
III. Рух коштів у результаті фінансової діяльності Надходження від: Власного капіталу	3300	--	--
Отримання позик	3305	--	20175
Інші надходження	3340	--	--
Витрачання на: Викуп власних акцій	3345	(--)	(--)
Погашення позик	3350	1308	15489
Сплату дивідендів	3355	(15242)	(--)
Витрачання на сплату відсотків	3360	(--)	(380)
Інші платежі	3390	(--)	(--)
Чистий рух коштів від фінансової діяльності	3395	-16550	4306
Чистий рух грошових коштів за звітний період	3400	-4085	5426
Залишок коштів на початок року	3405	6627	1181
Вплив зміни валютних курсів на залишок коштів	3410	--	20
Залишок коштів на кінець року	3415	2542	6627

Appendix D Statement of equity of the organization

Коди		
Дата (рік, місяць, число)	2020	01	01
за ЄДРПОУ	00488800		

Підприємство ПРИВАТНЕ АКЦІОНЕРНЕ ТОВАРИСТВО "ПЕТРОМИХАЙЛІВСЬКЕ"

Звіт про власний капітал
за 2019 рік

Форма № 4 Код за ДКУД 1801005

Стаття	Код рядка	Зареєстрований (пайовий) капітал	Капітал у дооцінках	Додатковий капітал	Резервний капітал	Нерозподілений прибуток (непокритий збиток)	Неоплачений капітал	Вилучений капітал	Всього
1	2	3	4	5	6	7	8	9	10
Залишок на початок року	4000	6198	--	14372	1444	34650	--	--	56664
Коригування: Зміна облікової політики	4005	--	--	--	--	--	--	--	--
Виправлення помилок	4010	--	--	--	--	--	--	--	--
Інші зміни	4090	--	--	--	--	--	--	--	--
Скоригований залишок на початок року	4095	6198	--	14372	1444	34650	--	--	56664
Чистий прибуток (збиток) за звітний період	4100	--	--	--	--	22290	--	--	22290
Інший сукупний дохід за звітний період	4110	--	--	--	--	--	--	--	--
Розподіл прибутку: Виплати власникам (дивіденди)	4200	--	--	--	--	-17368	--	--	-17368
Спрямування прибутку до зареєстрованого капіталу	4205	--	--	--	--	--	--	--	--
Відрахування до резервного капіталу	4210	--	--	--	--	--	--	--	--
Внески учасників : Внески до капіталу	4240	--	--	--	--	--	--	--	--
Погашення заборгованості з капіталу	4245	--	--	--	--	--	--	--	--
Вилучення капіталу : Викуп акцій (часток)	4260	--	--	--	--	--	--	--	--
Перепродаж викуплених акцій (часток)	4265	--	--	--	--	--	--	--	--
Анулювання викуплених акцій (часток)	4270	--	--	--	--	--	--	--	--
Вилучення частки в капіталі	4275	--	--	--	--	--	--	--	--
Інші зміни в капіталі	4290	--	--	--	--	--	--	--	--
Разом змін у капіталі	4295	--	--	--	--	4922	--	--	4922
Залишок на кінець року	4300	6198	--	14372	1444	39572	--	--	61586