

ECONOMIC EFFICIENCY IN THE USE OF LAND RESOURCES BY AGRICULTURAL ENTERPRISES IN THE CONTEXT OF GLOBAL DEVELOPMENT

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Abstract. *The subject* of the study is the economic efficiency of the use of land resources by agricultural enterprises. *Methodology.* The research was conducted using general scientific methods, in particular: theoretical generalization, methods of positive and normative analysis, statistical analysis. The goal is to analyze the dynamics of economic efficiency of land use by agricultural enterprises. *Research conclusion.* The economic efficiency of reproduction processes is the ratio of the amount of newly created value to the amount of capital, the cost of all resources and some of their main types. The peculiarity of the reproduction of land resources is that they are combined with the stage of production of agricultural products, when the reproduction of soil fertility is carried out in a single technological process of growing crops. Analysis of the efficiency of use of land resources by agricultural enterprises in Ukraine, which has significant areas of land suitable for agricultural production. It should be noted that agricultural land should be used more efficiently than in other countries. The activity of agricultural enterprises in general and their use of land resources can be characterized as extensive – a large number of resources are involved, and the return from each resource unit is low. In addition, the fact that landowners are not in a hurry to sell their agricultural land, realizing that in a few years a completely different offer price will be formed, as agricultural companies will enter the game and the demand for agricultural land will be much higher. It is necessary to mention that there are some difficulties in the research process, because today it is impossible to reflect the total volume of the Ukrainian agricultural land market in monetary terms, since the transaction price is declared in only 55% of the concluded transactions. In 2022, the average price of buying and selling agricultural land in Ukraine will be 38,560 UAH/ha. This is 28% higher than the average normative monetary value of arable land in Ukraine, which is UAH 27,520/ha.

Key words: economic efficiency, price of land, agricultural land, the efficiency of use of land resources, agricultural enterprises.

JEL Classification: E20, H56, O10

1. Introduction

Effectiveness and efficiency occur in various fields of human activity. These concepts are widely used in economics because they are closely related to the goals of economic development of society and market economy. Efficiency is a general scientific concept used in various scientific fields. It is derived from the concept of effect. An effect is a result of the consequences of actions. These concepts are usually considered independent, but they are closely related. Consider that the effect is the achievement of a result

in material or other terms. In this case, effectiveness is the relative effect and efficiency of the process, and phenomena are determined as the ratio of the effect to the cost necessary to obtain it. Effect and efficiency occur in various areas of human activity. These concepts are widely used in the economy because they are closely related to the goals of the economic development of society and the market economy.

After analyzing the works of foreign scientists, it is possible to select some relevant ones. For example, Qingmu Su and Xiaoqin Jiang (2021) attempted

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to evaluate the economic and environmental efficiency of land use from the perspective of the subjective preferences of land management decision makers. Herzig A., Nguyen T. T., Ausseil A. G. E., Maharjan G. R., Dymond J. R., Arnhold S., Tenhunen J. (2018) introduced an explicit indicator and the Land Use Management Support System to evaluate the resource use efficiency (RUE) of land use at the landscape scale. To estimate RUE, they related land use performance in terms of ecosystem service indicators to the maximum possible land use performance based on an optimized land use configuration. Fei, Rilong & Lin, Ziyi & Chunga, Joseph (2021) investigated how land transfer affects agricultural land use efficiency: Evidence from China's agricultural sector. Viana C.M., Freire D., Abrantes P., Rocha J., Pereira P. (2022) conducted a systematic review of the importance of agricultural land systems in supporting food security and sustainable development goals. The scientific discussion about the nature, criteria and other aspects of the economic efficiency of the use of land resources by agricultural enterprises does not weaken, which indicates the need for further research of this complex and multifaceted economic category under the conditions of market management.

The purpose of the article is to analyze the dynamics of economic efficiency of land resources use by agricultural enterprises.

2. Requirements for the use of land resources by agricultural enterprises in the context of global development

As a set of relations that arise between subjects of land law regarding ownership, use and disposal of land, including issues of ownership and management, turnover and land market, land prices and rents, land payments, management of land resources, regulatory rights and responsibilities of landowners and land users.

The main principles of the system of land relations in modern conditions are:

- equality of all forms of land ownership;
- payment for land ownership and land use;
- purposeful use of land of various categories;
- state regulation, accounting, control, and monitoring of land;
- accounting for regional characteristics of land use;
- environmental sustainability of land tenure and land use.

The choice of approach to land use planning depends on the political system of the country and the division of responsibilities between different parts of the administrative system. Some functions are performed at the national level, while others may be devolved to the local level. In addition,

the approach to urban development is often quite different from the approach to rural development. Therefore, it is appropriate to manage land resources in terms of individual land holdings or land uses, i.e., agricultural enterprises. A wide range of land functions in agricultural production requires the agricultural producer to find scientifically based measures for rational and practical use of available land resources. Today it is generally accepted that land, as the basis of activity and the primary means of production in agriculture, requires constant reproduction of the highest quality of land – soil fertility. The economic efficiency of reproduction processes is the ratio of the amount of newly created value to the amount of capital, the cost of all resources and some of their main types. The peculiarity of the reproduction of land resources is that they are combined with the stage of production of agricultural products, when the reproduction of soil fertility is carried out in a single technological process of growing crops. The expanded reproduction of land resources implies an improvement in their quality, which is manifested in an increase in soil fertility, and an increase in the efficiency of land use. In turn, the reproduction of soil fertility is equivalent to the expansion of the area of agricultural land with a relative saving of material, financial and labor resources. Therefore, the improvement of the soil quality should become one of the main criteria when the agricultural producer chooses the most profitable, from the economic point of view, direction of development.

3. Analysis of the dynamics of economic efficiency of land use by agricultural enterprises

Land transformations in Ukraine, which began more than thirty years ago, led to fundamental changes in land relations, the emergence of various forms of land ownership, and the complexity of management methods. The land reform mainly affected agricultural land, most of which was given to subjects engaged in commercial agricultural production (Figure 1).

As it can be seen from Figure 1, the total number of economic units and enterprises engaged in agriculture tends to increase. Thus, the total number of economic entities increased from 306,470 units. In 2016, 373,897 in 2020, while in 2019, their number was 380,673 units, by 6,776 units more than in 2020. The number of enterprises engaged in agriculture increased from 44,998 units in 2016 to 49,452 units in 2020, but this is 787 units less than the previous year, 2019 (State Statistics Service of Ukraine, 2021, Activity of business entities for 2020).

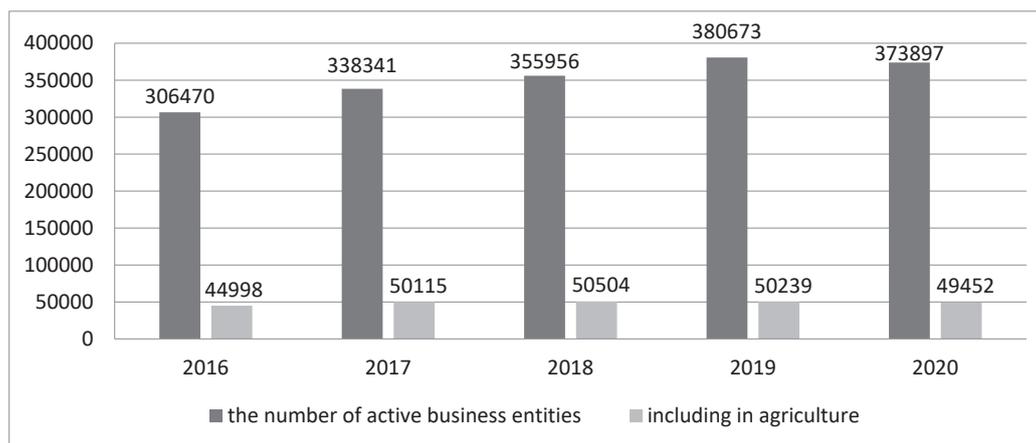


Figure 1. Dynamics of changes in the total number of economic entities and enterprises operating in the field of agriculture

Source: State Statistics Service of Ukraine 2021, Activity of business entities for 2020

Agricultural lands have a special legal regime and are subject to special protection in order to preserve their area, prevent the development of negative soil processes and increase soil fertility. According to the State Statistics Service of Ukraine, in 2022 the total area of agricultural land will amount to 41.33 million hectares, which is 69% of the total land area of Ukraine, having decreased in comparison with 2011 by 1.45 million hectares (about 2%) to 42.79 million hectares (71%) (State Statistics Service of Ukraine, 2022, Statistical Yearbook of Ukraine for 2021).

Consider the structure of agricultural lands. The central part of these lands is occupied by arable land – 79% (32757.3 thousand hectares), in the second place – pastures – 13% (5250.3 thousand hectares), hayfields – 6% (2283.9 thousand hectares), perennial plantations – 2% (852.7 thousand hectares), fallow land – less than 1% (166.7 thousand hectares) of the total area of agricultural land, which as of 2019 is 41310.9 thousand hectares (Table 1).

Table 1 shows that during the analyzed period the total area of agricultural land has been constantly decreasing: from 41,827.0 thousand hectares to 41,310.9 thousand hectares, i.e., by 516.1 thousand hectares (almost by 1.5%). This means that the norms

of the land legislation on the priority of the use of the land suitable for the needs of agriculture, primarily for agricultural use, are not fulfilled. Arable land is the most productive type of agricultural land. Arable land in agricultural enterprises in 2019 was located on the area of 32,757.3 thousand hectares, 79% of agricultural land. During the studied period, the growth of the area of these lands in Ukraine from 2000 to 2019 decreased by about 193.7 thousand hectares – from 32,563.6 thousand hectares in 2000 to 32,757.3 in 2019 (State Statistics Service of Ukraine, 2022, Agriculture of Ukraine for 2021).

This trend indicates the redistribution of area within agricultural lands: from Table 1 it can be seen that in 2019 compared to 2000 the area of pastures decreased by 271.0 thousand hectares – from 5521.3 to 5250.3 thousand hectares; hayfields on 104.7 thousand hectares – from 2388.6 to 2283.9 thousand hectares; perennial plantations on 79.2 thousand hectares – from 931.9 to 852.7 thousand hectares; fallow land more than doubled – by 254.9 thousand hectares – from 421.6 to 166.7 thousand hectares. That is, the area of such types of agricultural land as pastures, hayfields, perennial plantations and fallows in 2019 in comparison with previous years decreased by 709.8 thousand ha, part of this land was converted

Table 1

Dynamics of changes in the area of agricultural land by species (2000–2019), thousand hectares

Types of land	2000	2005	2010	2015	2016	2017	2018	2019
arable land	32563,6	32451,9	32476,5	32541,3	32543,4	32544,3	32698,5	32757,3
pastures	5521,3	5521,3	5481,9	5434,1	5430,9	5421,5	5282,6	5250,3
hayfields	2388,6	2429,2	2410,9	2406,4	2402,9	2399,4	2294,4	2283,9
perennial plantings	931,9	900,5	896,5	892,4	897,1	894,8	863	852,7
fallow land	421,6	419,3	310,2	233,7	230,6	229,3	190,5	166,7
Total agricultural land	41827,0	41722,2	41576,0	41507,9	41504,9	41489,3	41329,0	41310,9

Source: State Statistics Service of Ukraine, 2022, Agriculture of Ukraine for 2021

into arable land – 193.7 thousand ha, and part 516.1 thousand ha was withdrawn from agricultural use. A system of physical and value indicators characterizes the economic efficiency of land use in agriculture.

The main ones are:

- yield of crops, tons/ha;
- cost of gross production, gross and net income, profit per hectare, hryvnias;
- payback of costs for land resources, hryvnias per 100 hryvnias. material costs;
- profitability of production, %. When determining the indicators of economic efficiency of land use, it is necessary to take into account the quality of the land, i.e., its cadastral value. The following can be used as additional indicators of land use efficiency;
- specific weight of agricultural land in the total land area, %;
- specific weight of arable land in the structure of agricultural land, %;
- specific weight of sowing of crops in the arable area, %.

The economic efficiency of land use should be understood as the level of management. The relationship between the results of economic activity and the cost of resources always characterizes the economic efficiency. The economic efficiency of land use in agriculture is determined by a system of indicators. The most important is the yield of crops and the unit cost of produced products.

In Ukraine in 2019, the total cultivated area of crops on farms of all categories amounted to 28,581 thousand hectares, which is 434 thousand hectares (1.5%) more than in the previous year. However, there were changes in the structure of

cultivated areas of crops. The sown area of cereal crops amounted to 15,995 thousand hectares, which is 603 thousand hectares or 3.8% more than in the previous year, mainly due to the increase in wheat cultivation. A peculiarity is an appearance in the structure of significant cultivated areas of such crops as soybeans and rapeseed: in 2000, 65 and 214 thousand hectares of soybeans and rapeseed, respectively, were sown, and already in 2019, their areas increased to 1,066 and 1,311 thousand hectares, respectively, i.e., 16 times more soybeans and six times more rapeseed area (Table 2).

As mentioned above, the most valuable component of land is arable land. The efficiency of the entire agricultural sector depends on how fully and rationally it is used. In 2019, the area of used arable land, i.e., occupied by agricultural crops, was 28,581 thousand hectares, while the total area of arable land was 32,757 thousand hectares. That is, the difference is 4,176 thousand hectares. (12.7%). It is logical to assume that couples occupy part of this area. In general, however, it can be concluded that arable land is used inefficiently, since in 2019 more than 12% of arable land was not used for agricultural production for various reasons (Figure 2).

Productivity is a complex productive, quantitative and qualitative indicator, which allows to assess the general influence of natural, economic and climatic factors on the efficiency of land use. The conducted analysis showed that under the conditions of reduction of cultivated areas in the analyzed period, a trend of growth was outlined both in the gross harvest of the main zonal crops and their yield in agricultural enterprises (Table 3).

Table 2

Sown areas of agricultural crops (2000–2021), thousand hectares

Cultures	2000	2005	2010	2015	2016	2017	2018	2019
Cereals and legumes:	13646	15005	15090	14739	14839	15318	15392	15995
Wintery	6324	7289	7904	7904	7455	7836	7600	8226
Including wheat	5316	6185	6137	6696	6417	6650	6429	6908
Spring crops	7322	7716	7186	6835	7384	7482	7792	7769
Technical:	4187	5260	7296	8350	9266	9130	9224	9244
Sugar beet	856	652	501	237	276	222	220	227
Sunflower	2943	3743	4572	5105	6117	5928	6457	6622
Soy	65	438	1076	2158	1716	1609	1351	1066
Rapeseed	214	207	907	682	1042	1282	1127	1311
Potatoes, vegetable and melon food crops	2277	2941	1967	1823	1825	1828	1854	1807
Fodder	7063	3738	2599	1990	1769	1725	1677	1535
In total	27173	26044	26952	26902	27699	28001	28147	28581

Table 3

The leading indicators of the effectiveness of land use in agriculture

Indicators	2000	2005	2010	2015	2016	2017	2018	2019
gross collection, thousand tons	24459	38015,5	39270,9	60125,8	70056,5	75143,2	64933,4	86010,4
productivity, thousand tons/ha	19,4	26	26,9	41,1	47,4	49,1	42,5	53,9
collected area, thousand ha	12586,8	14605,2	14575,7	14640,9	14794,1	15291,9	15282,9	15948,4

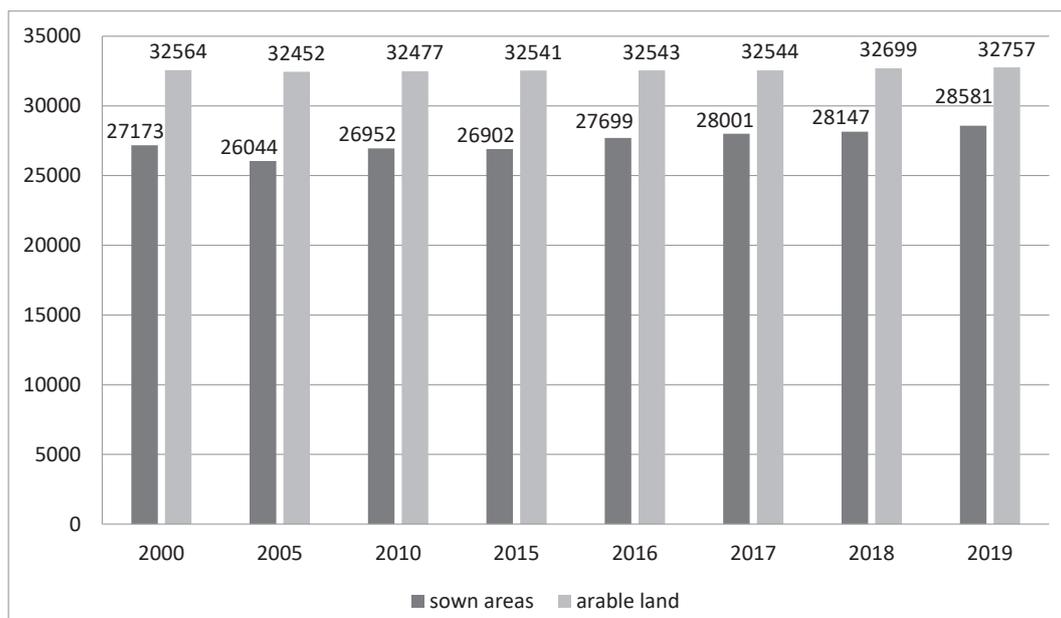


Figure 2. Comparison of the dynamics of changes in cultivated area with the total area of arable land (2000–2019), thousand hectares

Source: State Statistics Service of Ukraine, 2022, Agriculture of Ukraine for 2021

Thus, in 2019, the highest yield of winter wheat was achieved in the region – 45.3 tons/ha. Meanwhile, data from the State Statistics Service of Ukraine show that in European countries specializing in the cultivation of this crop, this indicator is several times higher than the level in Ukraine. For example, in the Netherlands 89.1 tons of wheat are produced per hectare, in Belgium – 88.3 tons, and in Ireland – 86 tons. Of course, in this comparison it is necessary to take into account the dependence of production conditions and results on random, first of all weather factors, but at the same time such a delay in Ukraine indicates a low level of organization of agricultural production, in particular, low efficiency of use of land resources by agricultural enterprises. In Figure 3 the average

dynamics of yields of grain and leguminous crops is shown.

As criteria of economic efficiency of use of land resources, scientists most often use the following indicators: the number of land payments to budgets (land tax, rent), the price of land, industrial indicators characterizing the final results of land use (gross agricultural production, inflow of investments), etc. In 2020, the price policy in European countries was formed as follows: the five leading countries that had the highest price for agricultural land are the Netherlands, Luxembourg, Italy, Great Britain, and Ireland, the average price of which was \$68.2 thousand/ha, \$35.6 thousand/ha, \$33.5 thousand/ha, \$23.5 thousand/ha, \$19.9 thousand/ha.

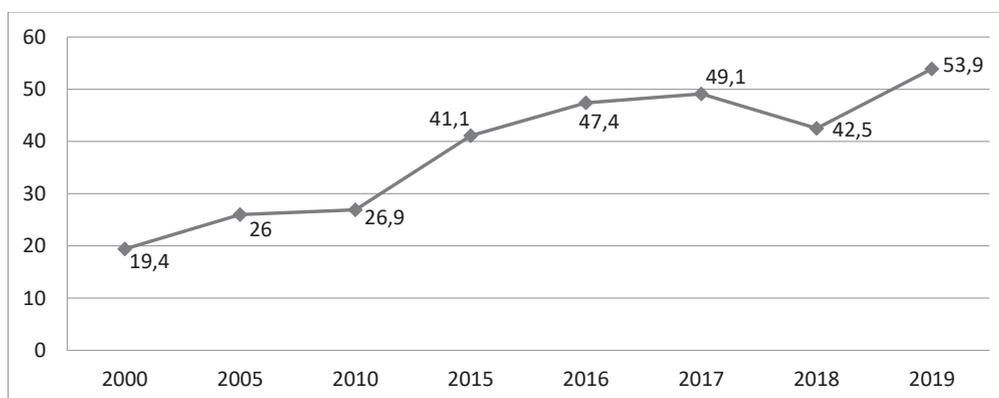


Figure 3. Dynamics of changes in the average yield of cereals and legumes (2000–2019), tons/ha

Source: State Statistics Service of Ukraine, 2022, Agriculture of Ukraine for 2021

However, there are several countries in which the price did not exceed \$3 thousand/ha, and these are Croatia, Latvia, Estonia and Romania (respectively \$3.0 thousand/ha; \$2.9 thousand/ha; \$2.9 thousand/ha; \$2.1 thousand/ha) (Table 4) (Land Directory of Ukraine 2020, 2022).

In 2022, the average price of buying and selling agricultural land in Ukraine will be UAH 38,560/ha. This is 28% higher than the average normative monetary valuation of arable land in Ukraine, which is UAH 27,520/ha (Table 4) (Business Censor, 2022).

As of 2022, 64,262 land sale and purchase agreements have been concluded in Ukraine. According to these agreements, agricultural land of the total area of 155.52 thousand hectares was sold, which is almost 0.38% of the total agricultural land in Ukraine. The most active buying and selling process was carried out in the Kharkiv region, where almost 7,000 transactions were concluded for the total area of 24,277 hectares, which is slightly more than 1% of the total volume of agricultural land in the region. On the contrary, the smallest number of transactions was carried out in the Ivano-Frankivsk region: 1,007 transactions with the total area of 464 hectares (0.07% of agricultural land in the region) (Business Censor, 2022).

Some difficulties arise in the research process because today there is no possibility to reflect the full volume of the Ukrainian agricultural land market in monetary terms, since, according to the Center for Food and Land Use Research of the Kyiv School of Economics, the transaction price is declared in only 55% of the concluded transactions (Business Censor, 2022).

The researchers of this institution modeled the value of land plots, taking into account their purpose, area, type of land and location of land plots to calculate the volume of the land market. Thus, the volume of the market in monetary terms is about 5.3 billion UAH. Analyzing the market structure, the most significant part of this market (3.2 billion UAH) is the so-called commercial land, the former moratorium land. About a third of the market (1.7 billion UAH) is land for personal agriculture. The third place in monetary terms is occupied by land for individual gardening, 2.4% of the market, with a total value of 127 million UAH (Business Censor, 2022).

From October 2021, the Cabinet of Ministers Resolution No. 1013 initiated electronic auctions for the lease and sale of agricultural land (Cabinet of Ministers of Ukraine, 2021). In just four months, 63 auctions for the sale of agricultural land were held through the electronic auction system "Prozorro.Prodazhi"; most of these auctions involved land that was under arrest and sold to pay off the debts of the former owner. In total, in the electronic system, since the beginning of the war in February 2022, auctions for the sale of agricultural land were held in 15 regions of Ukraine, where a total of 172.8 hectares of land were sold for the total amount of UAH 17.3 million. According to the electronic auctions, the average price of one hectare of land in 15 regions of Ukraine where the sale took place through the "Prozorro.Prodazhi" system ranged from UAH 32,260/ha in Mykolaiv Oblast to UAH 1,792,590/ha in Lviv Oblast (Figure 5).

Table 4

Prices for 1 ha of agricultural land after market opening

Countries	Price per 1 ha of land	Years since start of liberalization											
		1	2	3	4	5	6	7	8	9	10	11	12
Czech Republic	\$	1561	1621	1625	1867	2375	2557	2807	2962	3253	3400	3825	4455
	% to the previous year	3	4	0	15	27	8	10	6	10	5	13	16
Lithuania	\$	406	536	734	831	1075	971	1138	1605	1608	1883	2171	2220
	% to the previous year	4	32	37	13	29	-10	17	41	0	17	15	2
Estonia	\$	583	894	1125	1056	1111	1111	1083	1333	1681	2111	2417	
	% to the previous year	107	53	26	-6	5	0	-3	23	26	26	14	
Latvia	\$	1001	2183	3786	3552	1940	1015	1503	1804	3287	4144	4818	
	% to the previous year	90	118	73	-6	-45	-48	48	20	82	26	16	
Poland	\$	1464	2051	2388	3210	3668	4083	4333	4833	6150	6333		
	% to the previous year	12	40	16	34	14	11	6	12	27	3		
Hungary	\$	1771	1853	1927	1987	2221	2403	2416	2544	2880	3216		
	% to the previous year	2	5	4	3	12	8	1	5	13	12		
Romania	\$	972	1408	1500	1727	1891	2182	3000	3182	3364			
	% to the previous year	-3	45	7	15	9	15	37	6	6			
Bulgaria	\$	1202	1595	1519	1420	2092	2820	2930	3832	4558			
	% to the previous year	5	33	-5	-7	47	35	4	31	19			
Slovakia	\$	946	981	1017	1121	1211	1256						
	% to the previous year	4	4	4	10	8	4						

Source: Land Directory of Ukraine 2020, 2022

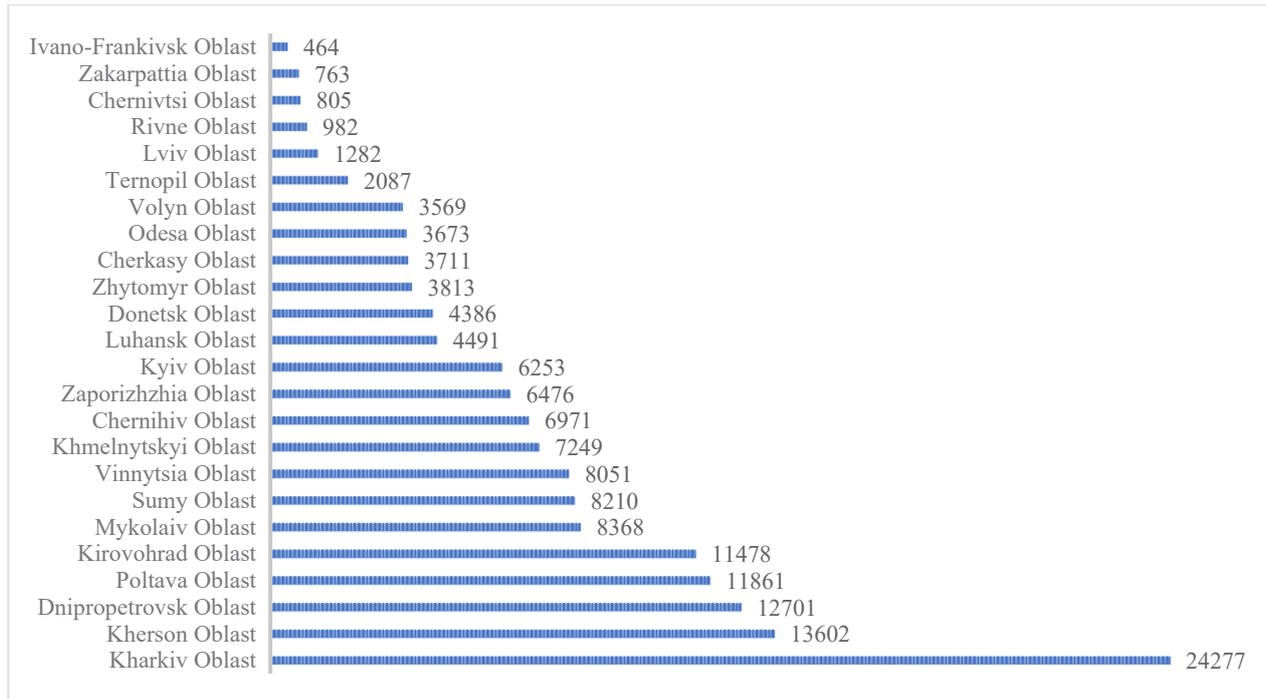


Figure 4. Ranking of regions of Ukraine by the total area of agricultural land sold by 2022, ha

Source: Business Censor 2022

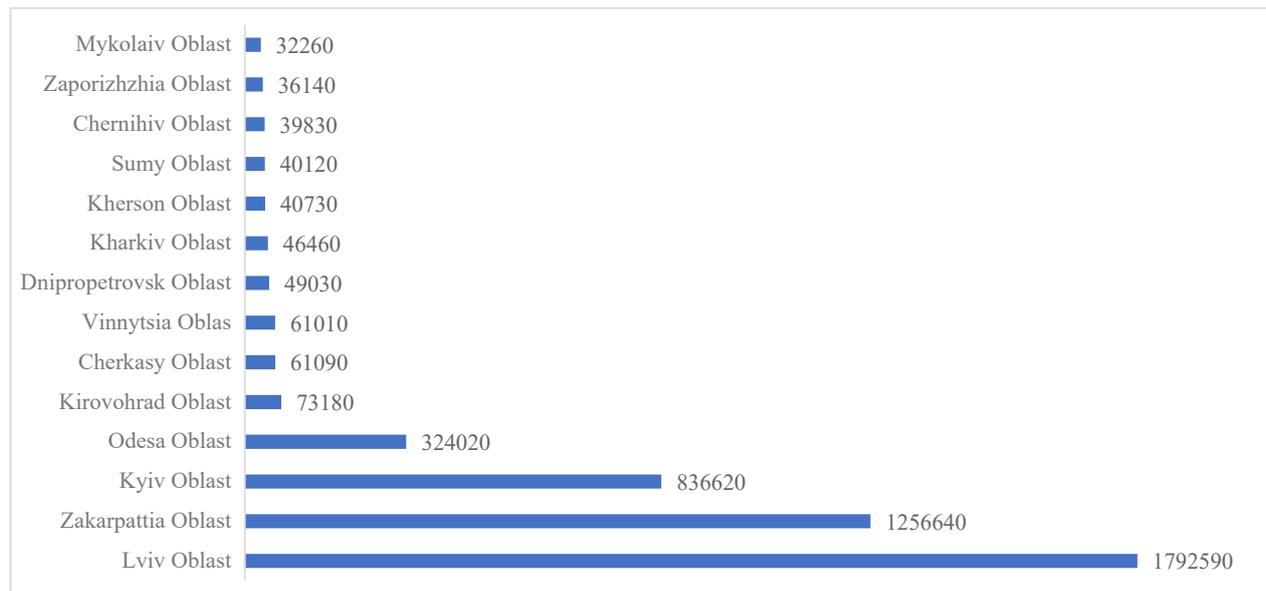


Figure 5. Average value of agricultural land sold at electronic auctions, UAH/ha

Source: Business Censor 2022

As it is shown in Figure 5, there is a great discrepancy between the prices of agricultural land even within the same region, especially in the case of the sale of land located near large cities or recreational areas with great development potential. For example, in the Lviv region through "Prozorro.Prodazhi" they bought an agricultural land with the area of 0.06 ha, which is located in the regional center on the

territory of the garden association for 350,000 UAH, i.e., 1 ha of this land would cost 5, 5 million UAH. A similar increase in prices occurred at auctions in the Kyiv, Odesa, Ivano-Frankivsk and Zakarpattia Oblasts (Business Censor, 2022).

In the conditions of global challenges, the effective use of land becomes the basis of military and economic recovery. Therefore, the study of the

world experience of use and sale is promising for further research (Pryshchepa, Kardash, Yakymchuk, et al. 2020; Popadynets, et al. 2021; Irtyshcheva, Kramarenko, Sirenko, 2022).

4. Conclusions

Analyzing the efficiency of land resources use by agricultural enterprises in Ukraine, which has significant areas of land suitable for agricultural production, it should be noted that agricultural land must be used more efficiently, also in comparison with other countries. The activity of agricultural enterprises in general, and their use of land resources in particular, can be characterized as extensive – a large number of resources are involved, and the return from each resource unit is low.

In addition, it can be highlighted as a feature of the use of land resources that the owners of land plots are not in a hurry to sell their agricultural land plots, realizing that in a few years a completely different supply price will be formed, because agricultural companies will come into play and the demand for agricultural land will be much greater. It should also be noted that some difficulties arise in the research process, because today it is impossible to reflect the total volume of the Ukrainian agricultural land market in monetary terms, since the transaction price is declared in only 55% of the concluded transactions. In 2022, the average price of buying and selling agricultural land in Ukraine will be 38,560 UAH/hectare. This is 28% higher than the average normative monetary value of agricultural land in Ukraine, which is 27,520 UAH/ha.

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