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ECONOMIC AND SOCIAL CONSEQUENCES OF THE CONCENTRATION OF PRODUCTION IN AGRICULTURAL ENTERPRISES IN UKRAINE

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Abstract

Research background: Assessment of the positive and negative aspects of the concentration of agricultural production in Ukraine, including in the form of agricultural holdings, is very dynamic due to the dynamic macroeconomic conditions of doing business here.
Purpose: The goal of the article is to present the results of research and an assessment of the consequences of the concentration of agricultural production in Ukraine through indicators of changes in the size and efficiency of agricultural enterprises.
Research methodology: The research methodology is based on the general dialectic approach and includes the following methods: induction, monographic, graphical, grouping, analysis of dynamic series, and formalization of calculation algorithms.
Results: Regularities of influence of the sizes of the agrarian enterprises on the efficiency of their functioning are revealed. The study showed that the concentration of production creates a number of strengths in agricultural production in the country as a whole which helps to solve certain social problems. However, the concentration of agricultural production does not increase the economic efficiency of enterprises.

Novelty: The assessment of the consequences of large agricultural enterprises in Ukraine and the activities of agricultural holding companies has been differentiated. Previously made conclusions of other researchers on the consequences of the concentration in agricultural production has been clarified.

Keywords: agriculture, agrarian enterprises, production concentration, agriholdings, production efficiency

JEL classification: O 13, Q 12, Q 15, Q 18

Introduction

The concentration of production reflects the concentration of production in large enterprises, resource and economic potential of which within the relevant industry is growing. This process is typical of agriculture in many countries around the world, including economically developed ones, where the share of production of huge according to size enterprises is growing (Hermans, Chaddad, Gagalyuk, Senesi, Balmann, 2017). Large agriproducers absorb the land resources and market shares of those farms that have failed to function successfully in the new economic realities. This leads to significant changes in the organization of agricultural production in some countries and in the world economy.

The process of the concentration of production is an important characteristic of agriculture also in Ukraine. Large agrarian companies are making significant efforts to expand their presence in the country's most attractive investment sector. Their enterprises have a strong material and technical base; in which they implement innovative production technologies. Exactly thanks to the activities of large companies, Ukraine has significantly increased the production and export of many types of agricultural products over the last decade.

At the same time, the economic and social consequences of high rates of concentration of production in agricultural enterprises in Ukraine are assessed rather ambiguously. There is a redistribution between users of a particularly valuable limited resource – agricultural land. Changes in the system of agricultural production affect the prospects for solving the problems of social development in rural areas. The assessment of the model of agrarian production, in which the role of large and especially large agricultural enterprises is growing, should take into account changes in the economic conditions of agricultural business.

1. Literature review

The main criterion for the size of the enterprise, which characterizes the level of concentration of production, researchers consider the volume of products produced by this enterprise (Grabovetskyi, Chaplygina, Koziar, 2015, p. 42; Paskhaver, 2013, p. 19). I. Artemenko considers the intensive form of concentration of production in agriculture (due to the increase of capital investment on the same land area) and its extensive form (due to the increase of the land resources involved). In the practical activities of agricultural enterprises, these forms are often intertwined when the enterprise increases the land area and at the same time forms a new technical and technological base of production (2016, pp. 25–26).

There are many claims about the significant positive impact of the concentration of agricultural production on its efficiency. It is manifested in savings on fixed costs, reduction of specific investment per unit of land area, higher manoeuvrability of resources, including in more efficient use of labor (Andriychuk, 2013, p. 685; Makarenko, 2005, pp. 235–236). Large enterprises have better access to financial resources, greater opportunities for the diversification of activities through the organization of the processing of agricultural products, and of its export (Demianenko, Sahaidak, Sas, Avramenko, Levkivskyi, 2021, pp. 181–182; Samarets, Nuzhna, 2018, p. 68). The growth of the size of enterprises in combination with high financial opportunities creates the preconditions for the implementation of scientific and technological progress in the production process, and the involvement of highly professional managers and specialists (Grabovetskyi et al., 2015, p. 41; Zos-Kior, 2015, pp. 130–131). Therefore, according to Paskhaver B., the obvious benefits of the concentration of production give reason to consider it the main way in the development of modern agriculture (2013, p. 23).

The thesis about the positive consequences of the concentration of agricultural production, by researchers can be confirmed by the data on the high growth rate in Ukraine in the technological efficiency of agricultural production, which was observed in parallel with the increase in enterprises sizes. However, K. Deininger, D. Nizalov and S.K. Singh (2018) believe that the critical situation in Ukraine at the beginning of the 20th century of many agricultural enterprises should be taken into account. Their reorganization has led to high rates of growth in the efficiency of agricultural production, which is not necessarily associated with an increase in its scale.

The growth of enterprise size has a positive effect on production efficiency only to a certain level, after which there is a gradual slowdown and stabilization of efficiency growth, and then there is a decrease in profitability (Grabovetskyi et al., 2015, p. 43). According to P. Makarenko,

the completeness of the benefits of large-scale agricultural production is due to the weakening of control over the production process, increasing the cost of domestic transportation and relocation. The acquisition of land requires significant funds, which limits the financial benefits of large agricultural enterprises (Makarenko, 2005, p. 240). Among the problems that accompany the concentration of agricultural production are challenges to the sustainable development of the rural economy, associated with the monopolization of the influence of large business structures, reducing the number of enterprises (Zinchuk, Kutsmus, Kovalchuk, Charucka, 2018, p. 617).

Some conclusions about the positive and negative consequences of the concentration of agricultural production are not fully confirmed in world practice. S.M. Helfand, N.E. Rada and M.M. Magalhaes (2017) note that successes in Brazilian agriculture are not limited to large farms. W. Cai (2019) argues that changes in the ratio of farms of different sizes in the United States have little impact on employment and productivity in agriculture.

Considering the process of the concentration of agricultural production in Ukraine, researchers pay much attention to assessing the performance of agricultural holdings, the attitude to which is ambiguous. The authors note that the activities of holding structures in agriculture are characterized by a significant number of benefits, however at the same time posing certain threats (Skydan, Budnik, Sus, 2021, pp. 110–111; Zhabynets, 2018, p. 108).

The main advantages of agricultural holdings are identical to the above-mentioned strengths of large agricultural enterprises. In addition, there is a positive effect of the high capacity of agricultural holdings, which are joint-stock companies, to attract foreign investment (Zhabynets, 2018, p. 108). Also foreign investors pass on to Ukrainian business modern world practices of social responsibility (Skydan et al., 2021, p. 112). Some authors are quite critical of the results of agricultural holdings in Ukraine. N. Davydenko, O. Kliuchka and Ju. Kulbach analyzed the financial performance of a number of large agricultural holdings and made conclusions about the inefficient capital management policies in these companies (Davydenko et al., 2019, p. 235). According to T. Gagalyuk and V. Valentinov, in conditions of institutional turbulence, agricultural holdings focus primarily on sustainability rather than efficiency (Gagalyuk, Valentinov 2019, p. 493). O. Skydan, O. Budnik and L. Sus believe that until recently the activity of agricultural holdings was inert and directed not to economic or social growth, but only to the agribusiness owners' ambitions and needs (Skydan et al., 2021, p. 117). Some researchers (Dudziak, Humeniuk, 2019; HodakIvska, Mogilniy, 2017; Shvorak et al., 2020) point to threats related to the depletion of natural resources due to non-compliance with environmentally friendly agricultural technologies, limited access to land for small producers, what leads to job cuts, increased rural migration and other negative processes.

L. Moldavan and O. Pimenova consider the holding structure of production as the formation of an undesirable oligarchic-latifundist system of management. In their view, agriculture should not take the organizational and legal form of a corporation (Moldavan, Pimenova, 2021, p. 217). Instead, A. Hutorov et al. believe that corporatism corresponds to the paradigm of sustainable and inclusive development, and allows to increase the investment attractiveness of agriculture (Hutorov et al., 2022, p. 53).

The presence of diametrically opposed assessments of the consequences of the concentration of production in agriculture in Ukraine in scientific publications, which led to the creation of agricultural holdings, necessitates a further study of the results of different sizes of agricultural enterprises in changing macroeconomic and institutional conditions.

2. Data and methodology

The source of the necessary information and of the necessary data for conducting the research was the materials of the publications of scientists dealing with the problem of the concentration of production in agricultural enterprises. The source of statistical data used in this study was the official information of the State Statistics Service of Ukraine.

For the proper processing of the specified sources of information and statistical data, the system of indicators formed for this study was used. In particular, the level of concentration of production in a particular industry is reflected in absolute and relative indexes. Absolute indicators are used to characterize the average size of the enterprise. The increase in the average size of enterprises indicates an increase in the level of the concentration of production. As relative indicators of concentration of production use the share of large enterprises in the total volume of all enterprises on the selected basis, as well as other indicators that characterize the uneven distribution of funds and production volumes among enterprises (Gutorov, 2011, p. 4).

A particularly important indicator for determining the size of agricultural enterprises is the area of land used by them (Artemenko, 2016, p. 27; Ignatenko, Runcheva, 2017, p. 11). Indicators of the concentration of production in certain sectors of agricultural production are the area of crops and number of animals.

To characterize the uneven distribution of land resources in agricultural enterprises of Ukraine, it is possible to use the method of the construction of the Lorenz curve as a function of the cumulative distribution of these resources (Grabovetskyi et al., 2015, p. 44; Gutorov, 2011). To quantify this inequality the Gini coefficient was used (G), which is calculated by the formula:

$$G = 1 - 2\sum_{i=1}^{n} P_i \cdot cumY_i + \sum_{i=1}^{n} P_i Y_i \quad (1)$$

where *Pi* – the share of enterprises of the *i*-th group in the total number of enterprises, Y_i – the share of land used by the *i*-th group of enterprises; $cumY_i$ – cumulative share of used lands; *n* – the number of enterprise groups.

The Gini coefficient varies from 0 to 1. The more concave in the graph is the Lorenz curve and the closer the Gini coefficient is to one, the higher is the uneven distribution of land resources. Relevant information reflects the peculiarities of the concentration of production in agricultural enterprises. To construct the Lorenz curve and calculate the Gini coefficient, our study used data from the State Statistics Service of Ukraine on the distribution of enterprises engaged in agricultural activities by area of agricultural land.

The universal indicator that characterizes the size of the enterprise is the amount of its income. Our study used data from the State Statistics Service of Ukraine, which classifies enterprises by size into large, medium and small ones, distinguishing small micro-enterprises. This classification is based on the following:

a) micro-enterprises – entities in which the average number of employees per calendar year does not exceed 10 people and the annual income does not exceed the amount equivalent to 2 million euros;
b) small enterprises – entities in which the average number of employees per calendar year does not exceed 50 people and the annual income does not exceed the amount equivalent to 10 million euros;
c) large enterprises – entities in which the average number of employees per calendar year exceeds 250 people and the annual income exceeds the amount equivalent to 50 million euros;
d) medium-sized enterprises – other business entities (*State Statistics Service of Ukraine*… 2015–2020).

Providing data on the activities of large, medium, small and micro enterprises, the State Statistics Service of Ukraine allocates in one category agricultural enterprises for the production of crop and livestock products, hunting and related services (code 01 according to the classification of economic activities used in Ukraine). Among these enterprises in Ukraine in 2020, the share of the number of hunting entities and related services was 0.9%, the share of output – 0.02% of the total indicators of enterprises classified in the activity code 01. Therefore, in subchapters 3.1, 3.2, 3.3 of this article detailed data on the results of activities by

group of agriculture, hunting and related services objectively reflect the economic consequences of the concentration of production directly in agricultural enterprises.

3. Results and discussion

3.1. Dynamics of the sizes of agricultural enterprises

The concentration of production in agriculture, as in other sectors of the economy, is preceded by the concentration of resources. Therefore, the increase in the volumes of using resources, among which a special place belongs to land, illustrates the intentions of agricultural businesses to increase its size in order to obtain additional income from increasing production.

As of November 1, 2020, there were 47,523 operating agricultural enterprises in Ukraine. Of these, 36,277 enterprises used agricultural land (*State Statistics Service of Ukraine*..., 2021, p. 163), or 73.3% of its total number. In dynamics, the number of agricultural enterprises, which had agricultural land, is declining. This is due to very fierce competition for the use of limited land. Land resources were redistributed among enterprises, which proved to be stronger in competition. As a result, the average size of land use of agricultural enterprises in Ukraine increased (Table 1), which reflects the process of the concentration of production in the branch.

Table 1. Dimensions of land use of agricultural enterprises in Ukraine, as of November 1

Index	2015	2016	2017	2018	2019	2020
The total number of agricultural enterprises	45,379	47,697	45,558	49,208	48,504	47,523
Number of enterprises which had agricultural land	42,052	41,826	40,735	40,333	38,523	36,277
The average area of agricultural land per enterprise – land user, ha	474	474	490	493	522	558
Number of enterprises with the area of agricultural lands: up to 100 ha	27,740	27,370	25,823	25,264	23,393	20,934
more than 10,000 hectares	161	150	166	180	179	184
The share of land, which had accounted for by enterprises with a size of more than 10,000 ha (%)	17.7	31.8	31.6	32.6	33.6	34.2

Source: calculated by the authors using the data of the State Statistics Service of Ukraine.

High rates of the reduction of the total number of enterprises – land users attract attention, mainly due to the reduction of the number of enterprises with a land use area not exceeding 100 ha. At the same time, the number of enterprises which used more than 10,000 hectares of land and the share of land resources used by them grew. The rapid decline in small-scale

land use raises concerns about the reduction in the number of jobs due to the concentration of agricultural production. Indeed, the number of employees in agricultural enterprises in Ukraine in 2020 compared to 2015 decreased by 11.4% (*State Statistics Service of Ukraine*… 2021, p. 166). On the other hand, it is worth noting, that the number of agricultural enterprises, which did not use agricultural land, increased from 3,327 in 2015 to 11,246 in 2020. This indicates a high interest in Ukraine in the agrarian business sector, in particular in areas, where the use of agricultural land is not mandatory.

More detailed information on changes in the size of land use of agricultural enterprises in Ukraine is given in Table 2. Some increase in the total area of land used by enterprises is due to the transfer of land from households – small farms, which conduct natural and semi-natural agricultural production and are not considered as subjects of entrepreneurial activity. Such a change of land users is one of the forms of the concentration of production in agriculture.

Table 2. Distribution of agricultural enterprises of Ukraine, which had agricultural land, by agricultural land's size as of November 1

Groups of enterprises by land area, ha	2015				2020			
	number of enterprises		area of agricultural land		number of enterprises		percentage to total enterprises	
	units	percentage to total enterprises	thsd. ha	percentage to total area of agri-cultural land	units	percentage to total enterprises	thsd. ha	percentage to total area of agri-cultural land
no more than 5.0	3,872	9.2	12.8	0.1	1,975	5.4	6.4	0.0
5.1–10.0	3,001	7.1	24.2	0.1	1,877	5.2	14.7	0.1
10.1–20.0	4,129	9.8	64.9	0.3	3,061	8.4	47.7	0.2
20.1–50.0	11,911	28.3	453.9	2.3	9,395	25.9	353.3	1.7
50.1–100.0	4,827	11.4	351.9	1.8	4,626	12.8	333.0	1.6
100.1–500.0	6,919	16.5	1,695.4	8.5	7,889	21.7	1,928.1	9.5
500.1–1,0000.0	2,467	5.9	1,757.9	8.8	2,716	7.5	1,957.9	9.7
1,000.1–2,000.0	2,446	5.8	3,510.3	17.6	2,409	6.6	3,458.9	17.1
2,000.1–3,000.0	1,099	2.6	2,659.1	13.3	1,030	2.8	2,500.3	12.4
3,000.1–4,000.0	516	1.2	1,785.9	9.0	473	1.3	1,629.9	8.1
4,000.1–5,000.0	282	0.7	1,259.8	6.3	247	0.7	1,099.2	5.4
5,000.1–7,000.0	281	0.7	1,646.4	8.3	263	0.7	1,535.9	7.6
7,000.1–10,000.0	141	0.3	1,172.3	5.9	132	0.4	1,107.0	5.5
more than 10000.0	161	0.4	3,527.9	17.7	184	0.5	4,280.1	21.1
Total enterprises	42,052	100.0	19,922.7	100.0	36,277	100.0	20,252.4	100.0

Source: calculated by the authors using the data of the State Statistics Service of Ukraine.

Based on the data in Table 2 for 2020 using the formula 1 the Lorenz curve was built, which illustrates the distribution of land resources between enterprises of different sizes (figure 1). The deep slope of the curve indicates high inequality in land use. In particular, in 2020, 45%

of enterprises, which used no more than 50 hectares of land accounted for only 2% of land. On the other hand, the institutional conditions for conducting agrarian business in Ukraine have made it possible to form a group of enterprises, which positions in the regional and local segments of the land lease market are strengthening.

Calculated according to the formula 1 the Gini coefficient, which illustrates the uneven distribution of land resources between agricultural enterprises of Ukraine, in 2015 was 0.827, in 2020 it decreased to 0.806. Some of its reduction is due to the closure of small enterprises, whose land resources are transferred to the use of large businesses.

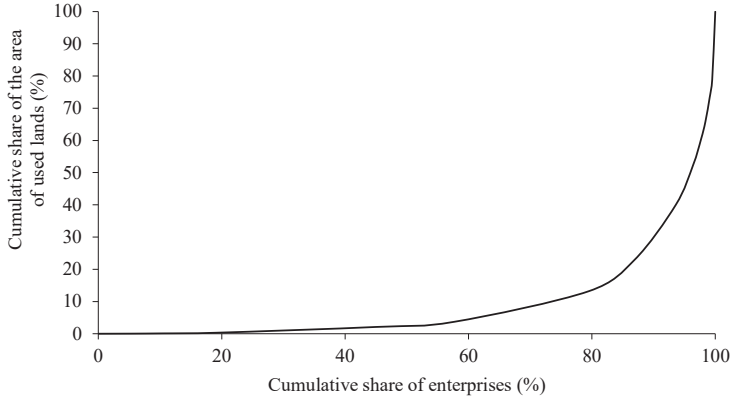


Figure 1. Distribution curve of the cumulative shares of concentration in the use of agricultural lands by agricultural enterprises of Ukraine, 2020

Source: own elaboration.

Data about the concentration of production of certain types of products in agricultural enterprises of Ukraine are given in Table 3. In crop industries, the level of concentration of production reflects the indicators of enterprises with a particularly large (over 1,000 hectares) area of crops. The concentration of grain and sunflower cultivation is especially high, which forms key positions in Ukraine's agricultural exports. The concentration of sugar beet production in a relatively small number of enterprises reflects the growth of monopolization in the sugar beet branch.

There is a high level of concentration of production in the main animals' branches – poultry, pigs and livestock. Concentrations of animals and poultry are often accompanied by the exacerbation of environmental problems. In addition, neutralization of the negative consequences of the concentration of livestock production is not always given due attention.

Table 3. Concentration of production in certain branches of agriculture in agricultural enterprises of Ukraine

Indexes	2015	2018	2019	2020
Number of enterprises with the size of the harvested area over 1,000 hectares:				
– grain and leguminous crops	2,993	2,907	2,987	2,950
– sunflower	819	1,066	1,005	1,142
– sugar beet	51	55	50	56
– rape and colza	…	139	175	164
– soya	…	86	91	63
Share of products (%), produced in enterprises with a harvested area over 1,000 ha:				
– grain and leguminous crops	67.8	65.4	64.8	66.1
– sunflower	37.2	40.4	40.1	44.6
– sugar beet	54.6	49.8	56.9	64.8
– rape and colza	…	25.9	22.6	22,8
– soya	…	28.4	21.5	18.7
Share of cattle in enterprises holding more than 1,000 head of cattle at the end of the year (%)	52.6	55.6	56.3	55.6
Share of pigs in enterprises holding more than 10,000 pigs at the end of the year (%)	…	62.0	61.4	64.5
Share of poultry in enterprises holding more than 500,000 poultry at the end of the year (%)	…	78.5	80.5	80.6

Source: calculated by the authors using the data of the State Statistics Service of Ukraine.

Table 4 shows the data on the grouping of agricultural enterprises by size according to the volume of production value. The grouping feature is the assessment in current prices of products (goods, services) actually produced by the company, which includes products manufactured and shipped outside the company, made at its own expense for investment, as well as other non-financial income.

Table 4. Agricultural, hunting and related services enterprises

Size of enterprises	Number of enterprises		Production value			
			million UAH		percentage to total production	
	2015	2020	2015	2020	2015	2020
Large	23	36	68,731.0	90,515.0	17.4	14.1
Medium	2,200	1,827	201,514.1	300,683.3	50.9	46.8
Small	42,668	45,889	125,762.3	251,750.8	31.7	39.1
Micro-enterprises	38,014	40,885	34,693.2	82,159.7	8.8	12.8
Total enterprises	44,897	47,752	396,107.4	642,949.0	100.0	100.0

Source: calculated by the authors using the data of the State Statistics Service of Ukraine.

These data refute the thesis of strengthening the role of particularly large agricultural enterprises, and their undeniable market advantage over smaller enterprises. Although during 2015–2020 the number of large enterprises according to the classification of the State Statistics Service increased significantly, with their share in the total output of all enterprises decreased. If in the group of small enterprises during this period the cost of production doubled, including micro-enterprises – 2.4 times, in the group of medium-sized enterprises – one and a half times, in the group of large enterprises – only 32%.

3.2. Activities of agricultural holdings

Agriholding is a joint-stock company that owns, uses and disposes of holding blocks of shares of corporate enterprises engaged in economic activities in the agricultural sector of the economy. It is an association of enterprises that includes a parent company and its subsidiaries. The activity of agricultural holdings is an important characteristic of the results in the concentration of production in agricultural enterprises.

Each agricultural holding is an association of entities that provide not only the production of agricultural products, but also their processing, storage, logistics processes and more. Some enterprises within Ukrainian agricultural holdings vary considerably in size and may be located in different regions of the country. Agricultural holdings can be characterized by both narrow and fairly broad specialization.

There is no official information on the number and resource potential of agricultural holdings in Ukraine. Agricultural Consulting provides data on 52 such structures, which used a total of 4.5 million hectares of land in early 2022. This list does not include private entities that did not have an official governing body. Also not taken into account are those companies that were in the process of liquidation at the time of processing information or all their property was seized by international courts (*Agricultural Consulting*…, 2022).

Table 5 shows the data on the largest agricultural holding companies in Ukraine, each of which as of the beginning of 2022 used more than 100,000 hectares of land. The size of the land banks of a number of the largest agricultural holdings has fluctuated markedly in recent years, including declining. This indicates the constant nature of organizational changes in the environment of large agrarian business in Ukraine.

Table 5. Agricultural holdings of Ukraine with a land bank of more than 100,000 hectares

Name	Land bank, thousand hectares, at the beginning of the year		The main activities in the field of agri-food production
	2018	2022	
Kernel	550	506	Production and export of cereals and oilseeds. Production and export of sunflower oil. Sugar beet and, sugar production. Dairy farming
Ukrland farming	570	460	Production and export of cereals and oilseeds. Livestock, pig breeding, production of eggs and egg products. Production of compound feeds
MHP	370	370	Production, processing and export of poultry meat. Production and export of cereals and oilseeds. Feed production. Biogas production
Agroprosperis_Group	400	300	Production and export of cereals and oilseeds.
Astarta–Kyiv	250	220	Production and export of cereals and oilseeds, sugar. Milk production and processing. Production and processing of soybeans, export of soybean oil. Biogas production. Organic agricultural production
Continental Farmers Group	165	195	Production and export of cereals and oilseeds. Potato growing. Starch production. Seed production
Epicentr Agro	111	160	Production and export of cereals and oilseeds. Dairy farming. Seed production
AST	110	150	Production and export of cereals and oilseeds
HarvEast	102	127	Production of grain and oilseeds. Dairy farming. Production of compound feeds. Seed production
IMC	130	120	Production and export of cereals and oilseeds. Dairy farming
Ukrprominvest-Agro	117	120	Sugar beet growing, production and export of sugar. Production of oilseeds and cereals. Flour production. Dairy farming
Agroton	110	110	Production of grain and oilseeds. Dairy and meat cattle breeding
Agrain	110	110	Production of grain and oilseeds. Dairy and beef cattle breeding. Pig breeding

Source: own elaboration based on (*Latifundist.com*…, 2022).

Almost all agricultural holding companies pay considerable attention to the production of export-oriented cereals and oilseeds. At the same time, of the 13 companies listed in Table 5, only 3 specialize exclusively in crop production. All the others combine the production of plant and livestock products, and occupy leading positions in Ukraine among producers of meat, milk and eggs. To meet the needs of livestock, agricultural holdings often include feed mills. Using waste from the production and processing of agricultural products, MHP and Astarta-Kyiv have established biogas production.

Among the 13 largest agricultural holding companies in Ukraine, 3 were created by foreign investors (Agroprosperis Group, Continental Farmers Group, and Agrain). Shares of a number of companies are traded on stock exchanges. Some companies have been severely affected by the hostilities that began in Ukraine in February 2022. At the same time, large agricultural holdings,

which own large tracts of fertile land, remain attractive targets for investment. Therefore, after the war, they can hope to raise funds in one way or another to fully resume operations.

3.3. Analysis of the dependence of the efficiency of agricultural enterprises on their size

The results of the concentration of production in agricultural enterprises can be characterized by indicators of the efficiency of these enterprises. The dependence of efficiency indicators on farm size reflects the importance of competitive advantages that can be achieved by large agricultural producers.

The main indicators of technological efficiency of crop production are crop yields. The data in Table 6 below show that there is a direct relationship between the level of concentration of production and yields of most major crops grown in agricultural enterprises of Ukraine. The difference in yield between the groups of the largest (with a harvested area of more than 1,000 ha) and the smallest (with a harvested area of not more than 100 ha) enterprises is especially noticeable. However, in some crop industries there is no direct relationship between the studied traits, i.e. the competitive advantages of large enterprises are clearly not expressed.

Table 6. Dependence of crop yields in the concentration of crop production in the agricultural enterprises of Ukraine, 2020

Crop	Yield of agricultural crops, c/ha					Group indicator 4 in percent to the indicator	
	in the group of enterprises with the harvested area, ha				in all enterprises		
	1. no more than 100.0	2. 100.1–500.0	3. 500.1–1000.0	4. 1,000.1 and more		group 1	in all enterprises
Wheat	31.7	38.1	40.5	42.7	39.8	134.7	107.3
Maize for grain	41.6	53.4	58.9	66.7	60.9	160.3	109.5
Sunflower	16.4	20.4	20.8	22.8	21.4	139.0	106.5
Sugar beet	450.4	443.4	421.7	412.4	421.0	91.6	98.0
Rape and colza	21.7	23.3	23.6	22.4	23.0	103.2	97.4
Soya	17.1	20.3	22.9	23.1	21.3	135.1	108.5

Source: calculated by the authors using the data of the State Statistics Service of Ukraine.

Indicators of economic efficiency of enterprises reflect the financial results of their operation. The data in Table 7 indicate that large agricultural enterprises do not have an advantage over smaller enterprises in these indicators, and are often inferior to them. In 2020, out of 36 agricultural enterprises in the category of large 9 ones (one in four) were unprofitable. There is no definite relationship between the size of agricultural enterprises and their economic efficiency.

Table 7. Economic efficiency of agricultural, hunting and related services in Ukraine (%)

Year	Total	Of which			
		large enterprises	medium enterprises	small enterprises	microenterprises
Profitability of operating activities					
2018	18.9	22.9	18.2	18.8	16.5
2019	19.8	8.3	27.7	13.5	15.7
2020	19.1	16.0	19.6	19.9	18.2
Profitability of the main activity					
2018	14.2	21.2	15.2	11.0	7.9
2019	16.6	6.1	25.0	9.6	9.0
2020	14.0	9.7	14.7	14.9	15.3
Share of profitable enterprises					
2018	86.5	100.0	87.1	86.5	86.4
2019	83.3	79.4	79.3	83.5	83.9
2020	82.9	75.0	82.7	83.0	82.8

Source: calculated by the authors using the data of State Statistics Service of Ukraine.

The lower profitability of large agricultural enterprises is due to the high cost of their products. Large enterprises use significant volumes of non-current and current assets, the payback of which is not high enough. Small agricultural enterprises are able to demonstrate high financial results, especially in market niches, which are not interested in large agricultural producers.

One of the key indicators of the social efficiency of enterprises is the level of remuneration of their employees. In Ukraine, there is a clear direct link between the size of agricultural enterprises and the level of the wages of employees.

Table 8. Labour costs per employee in agricultural, hunting and related services in Ukraine, thousand UAH

Year	All enterprises	Including			
		large	medium	small	micro-enterprises
2015	35.4	54.4	37.5	26.3	18.8
2016	43.4	71.5	47.3	30.9	23.9
2017	61.2	96.8	68.7	44.6	26.7
2018	78.6	121.8	86.4	59.3	45.7
2019	94.9	157.6	102.9	69.0	49.6
2020	104.9	176.2	115.5	76.4	52.7
2020 to 2015 (%)	296.3	323.9	308.0	290.5	280.3

Source: calculated by the authors using the data of the State Statistics Service of Ukraine.

Larger by size producers provide not only higher wages for their employees, but also funding for other human capital development programs in the enterprise. The level of wages in agriculture depends on the employment of workers – days, hours worked during a certain period. In large enterprises, the opportunities for full employment are much higher, than in small ones.

In 2020, one large (according to the classification of the State Statistics Service of Ukraine) agricultural enterprise had 1,072 employees, a medium – 126, a small – 4, a micro-enterprise – less than two. A significant number of jobs outside of agricultural production are created by agricultural holdings, which include processing, logistics and other enterprises.

3.4. Formation of the social responsibility of large agricultural enterprises

Critical assessment by some researchers of the development of large agricultural enterprises in Ukraine is based on the thesis that their activities are not in the public interest. In this regard, it is advisable to consider the practice of large farmers to comply with the principles of social responsibility. The term "social responsibility" conveys the responsibility of the organization for the impact of its activities on society and the environment (*Guidance on social responsibility*…, 2010). The most important manifestations of social responsibility of large agricultural enterprises and agriholding structures are their responsibility as an employer, user of natural resources, participant in economic relations with the state, and participant in social relations at the local level.

The social responsibility of the employer is manifested in the provision of a decent level of remuneration of its employees, and the provision of additional benefits in the form of a social package. The analysis showed that the labor costs of one employee in large agricultural enterprises significantly exceed the corresponding costs in small farms. Jobs in large enterprises are advantageous in that they provide more full-time employment during the year. In addition, these workers receive more benefits from the social package. It should be noted that in the agricultural enterprises of Ukraine in general, the cost of maintaining labor, which does not belong to the payroll, is much lower than in other major sectors of the economy.

Directly in the field of agricultural production in large enterprises, fewer jobs are created per 1,000 hectares of land. However, large enterprises and agricultural holdings can create additional jobs in the structures that perform the functions of service, processing of raw materials and more. If small holding farmers will not provide their workers with a sufficient level of income, the jobs they create will not solve the social problems of rural areas.

Agricultural production has a significant impact on the environment, in particular on the condition of arable land. An urgent problem is the negative impact on the environment of concentrations in large numbers of livestock and poultry. Intensive technologies of crop production, which are used by large enterprises, involve the use of a significant number of agrochemicals. This requires the formation of effective control over the environmental consequences of agricultural production by government agencies and public organizations.

Large enterprises make significant efforts to lease land resources for a long period (at least 15 years). They are interested in maintaining a high level of soil fertility, so it is not advisable to link their activities with the depletion of land resources. On the other hand, violations of technologies that lead to soil degradation are possible in the activities of farms of different sizes. It is inexpedient to link the aggravation of environmental problems exclusively with the increase in the concentration of agricultural production.

The structure of Ukraine's agricultural exports is dominated by sales to foreign markets of products of grain and oilseed production and processing. The main producers of these products are large enterprises, and the organization of their exports is an especially important role of agricultural holdings. Experts often criticize the raw material nature of Ukrainian agricultural exports. However, it is impractical to place the responsibility for such a composition exclusively on large enterprises. The cultivation of cereals and oilseeds pays attention to farms of different sizes, including small ones. The state should regulate the structure of agricultural production not by administrative but by purely economic methods.

In Ukraine, significant funds are allocated to finance state programs to support agricultural producers. To ensure the rational use of these funds, restrictions have been introduced on the total amount of state support for one agricultural producer, and taking into account related persons. Priority support is provided to small farms that own and / or use no more than 100 hectares of agricultural land and whose annual income from sales does not exceed 5 million hryvnias. This norm is an important component of state influence on the process of the concentration of agricultural production in Ukraine.

Large agricultural enterprises are very active in contacts with local territorial communities. The websites of the leading agricultural holdings of Ukraine contain information on numerous practices of their participation in measures for the social development of rural areas. Large producers are interested in working with communities because they rent land from local landowners. Different sizes of enterprises can prove themselves as a socially responsible business entity. At the same time, the financial capabilities of large agricultural producers make it possible to implement much larger projects.

3.5. Agriholdings of Ukraine and contemporary problems of food security in the world

In this context, two groups of problems should be considered – problems for agricultural holdings related to the conduct of hostilities on their lands; problems for the world due to the threat of famine due to the Russian war in Ukraine.

Ukraine produces a significant share of world food: about 27% of sunflower seeds, 5% of barley, 3% of wheat and rapeseed, 2% of corn (*World exporters…*, 2022). The largest importers of Ukrainian agricultural products are traditionally China, India, the Netherlands, Egypt, Turkey, Poland, Spain, Indonesia, Germany, Italy, as well as the poorest countries in Africa and Asia. In general, Ukraine provides almost 14% of the global food market. This means that if the war is not stopped now, and Ukraine does not properly sow its crops and be able to supply 50 million tons of grain to global markets, the world's poorest countries will be left without food. That is, hundreds of thousands of people will simply be doomed to starvation (*World markets…*, 2022). Because of this war, the country is now unable to deliver record autumn harvests to the $ 120 billion world market. Grain exports are currently limited to 500,000 tons per month, compared to 5 million tons before the war. This, according to the Ministry of Agrarian Policy of Ukraine, means a loss of $ 1.5 billion. Ukraine cannot export 90 million tons of grain due to Russia's blockade of ports, which is why it is losing $ 170 million every day (!). In general, Ukraine exported more than 70% of all cargo through seaports for a total of about $ 47 billion.

The consequences of such actions by the occupiers have already been felt in the world. Against the background of a sharp rise in prices for wheat, corn and sunflower oil, some countries are facing famine, and most are facing a food crisis. Currently, almost 70 vessels are blocked in the seaports of Ukraine, including 10 in the port of Odessa. The vast majority of ships are bulk carriers and general cargo vessels. Exports of wheat and corn in April amounted to slightly more than 730,000 tons, although in December 2021 the total exports of only these two main cereals exceeded 6 million tons of cargo (*The hype…*, 2022). The European Commission noted that "after Russia's invasion into Ukraine and its blockade of Ukrainian ports, Ukrainian grain and other agricultural products can no longer reach their destination. The situation threatens global food security" (*The European…*, 2022). Even the relocation of supplies from other countries will not be able to compensate for the loss of supplies from Ukraine (*World exporters…*, 2022). Due to the invasion of Russian troops, Ukraine will be able to sow about 30% of the planned area during spring field work, and according to the most optimistic experts – up to 50% of the planned area this season, i.e. no more than 21 million hectares, mainly in western Ukraine. The country will be able to provide itself with food, even having harvested 30% of the planned

yield. This is possible due to significant transitional reserves – 33.4 million tons of grain crops (*World markets…*, 2022).

At the same time, the situation with world food security seems to be much more pessimistic. So, the importance of Ukrainian agricultural holdings is growing, providing the production of almost 70% of grain and oilseeds and almost 50% of sunflower. Under the current circumstances, in very dynamic conditions, companies have to completely restructure and look for new solutions. Restrictions of exports will encourage the Ukrainian economy to increase the share of finished products in the structure of exports as opposed to the sale of raw materials. Processing allows not only to increase the cost of production, but also to reduce volumes even with minimal processing. In the agrarian sector, especially – in agriholdings, this can be seen in the growth of livestock, grain processing into flour and pasta, and corn – into starch and amino acids.

One of the largest Ukrainian agro-exporters, Astarta (243,000 hectares), admits that "everything we are used to thanks to Ukraine's developed port infrastructure will have to be postponed until Ukraine wins and the Black Sea and Azov ports are launched."

An analysis of the activities of agricultural holdings during the war shows that almost all of them made the most of the opportunities for the sowing campaign, except for the reduction of a certain part (in some companies – up to 30%) (*Grow…*, 2022) of the sown area are due to its mining or occupation by Russia. Some of them have reduced the area growing corn, as the most expensive and complex logistics grain crop, by increasing the growing of oats, soybeans, rapeseed and sunflower.

Conclusions

The concentration of agricultural production in Ukraine has a particularly significant impact on the organization of land use. The number of small agricultural enterprises using land resources is rapidly declining. Instead, the number and resource potential of enterprises, which use particularly large areas of land is growing.

Large agricultural enterprises often show better technological efficiency indicators than small ones. However, the concentration of production in the agriculture sector of Ukraine in recent years has not provided high economic indicators. The growth rate of production in the group of large enterprises was much lower than in the group of small enterprises. There were many unprofitable enterprises among large and medium-sized enterprises.

Large agricultural enterprises show high indicators of social efficiency of economic activity. They create fewer jobs in agricultural production, but provide significantly higher wages, than small businesses, and pay high taxes. Additional jobs are created by agricultural holdings in the process of the diversification of their activities beyond agricultural production. Large enterprises and agriholding structures allocate significant funds for measures for the social development of rural areas, with charity.

The increase in the concentration of agricultural production is often accompanied by an exacerbation of environmental problems, but the negative impact on the environment cannot be blamed only on large enterprises.

Large-scale agricultural production is an investment-attractive and highly liquid business. In view of this, we are optimistic about the prospects of finding sources of funding to restore the activities of agricultural companies affected by the war in Ukraine. At least, contrary to traditional views, during the war in Ukraine, large agricultural enterprises such as agricultural holdings proved to be much more mobile, flexible and more suitable for economic survival, than smaller enterprises.

The concentration of agricultural production has a number of advantages for the agrarian production system of the country as a whole, which are not always transformed into the high performance activity of individual large enterprises. A number of negative aspects of the concentration of production can be neutralized or mitigated by antitrust and other regulatory levers of government agencies. The issue of providing small agricultural enterprises with opportunities to use land resources remains relevant.

Agriholding formations make a significant contribution to food security for the state ensuring the export potential of the agro-industrial complex increasing and are currently the most competitive form of agro-industrial production in Ukraine. Due to the synergy effect, they achieve better performance, while gaining additional market advantages. In agriholding formations, competitiveness is achieved through a closed cycle of production and the sale of large batches of agricultural products and/or food products in domestic and foreign markets. At the same time, the bulk of profits in these structures is formed in the areas of processing and circulation of finished products.

Drawing a general conclusion about the activities of agricultural holdings in Ukraine, it can be argued that their role in the development of agribusiness is significant and will increase in the future. The process of the concentration of agricultural land by agricultural holdings through its lease and bankruptcy of inefficient agricultural enterprises will continue. This factor must be taken into account when developing the state's agricultural policy and programs to support rural

development. The state needs to perceive agricultural holdings as an objective reality and to direct their activities in the direction of the governments agrarian strategy.

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