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MANAGEMENT AND MARKETING OF THE WARTIME AGRIBUSINESS IN UKRAINE

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Introduction. Full-scale military actions led to the need for radical changes in the management of agricultural enterprises. Effective management of Ukrainian agribusiness under conditions of military aggression can contribute to the stability of revenues to the country's budget and strengthen national security, particularly in providing the population with food and jobs in depressed rural regions. The state of war in Ukraine determines the peculiarities of the activities of agricultural enterprises and, accordingly, forms the peculiarities of agricultural management, which requires scientific research.

Aim and tasks. The study aims to develop directions and tools for managing agricultural enterprises in the conditions of war in Ukraine. The task of the study was to develop a mathematical model of operational change in the goal of an agro-enterprise, establish conditions for changing agribusiness goals, determine wartime requirements for agribusiness management, and assess the impact of the war on the components of the resource potential of agricultural enterprises.

Results. A mathematical model of the operative change in the purpose of an agro-enterprise under the conditions of acquisition of integral risks, including the risk of military operations, of a degree greater than 50%, has been developed. The study of the components of the resource potential established the following: the growth of the dynamism of the land market, the acceleration of the redistribution of land ownership - the alienated area of land in 2023 compared to 2022 has almost doubled; the share of individual entrepreneurs in the total number increased by 19.8% in 2022; a decrease in the level of provision of labour resources, which has long-term and short-term dimensions related to military operations, reducing the volume of imports of agricultural machinery by approximately 30–35%. The implementation of effective management requires a comprehensive approach to the formation of systemic prerequisites for agricultural activity and the improvement of the structure of agricultural production, taking into account the impact of the war in Ukraine.

Conclusions. The developed mathematical model makes it possible to change the goals of agricultural enterprises in an operational manner and form an appropriate level of competitiveness to ensure the viability of agricultural enterprises. The proposed directions and management tools of agricultural enterprises will ensure an increase in the efficiency of agribusiness management during wartime conditions. Evaluation of the impact of the war on the components of the resource potential of agricultural enterprises will increase the efficiency of resource use.

Keywords: economic mechanism, competitiveness, agribusiness management, marketing, resource potential.

1. Introduction.

Before the beginning of the large-scale aggression, the agricultural sector formed 10.9% of the Ukrainian GDP, provided 41% of the exports and up to 14% of the population worked in agriculture (State Statistics Service of Ukraine, 2021b). During this period, Ukraine had a significant share in the export volumes of world food: almost 10% of export supplies were wheat, more than 10% were corn and barley, and approximately 40% were sunflower oil.

However, when hostilities engulfed the territories of Ukraine, where 36% of grain crops were grown before they began, approximately 30% of agricultural land was mined by the aggressor and traditional logistics routes were cut. As a result of the specified war threats, grain exports in 2023 decreased by 13%, and the total losses to the agricultural sector for this period amounted to \$40.2 billion, including direct losses of \$8.7 billion.

This also resulted in a significant increase in the risks and costs of agricultural production, which large agrarian corporations and small- and medium-sized agricultural enterprises suffer from. According to the Food and Agriculture Organization (FAO), more than 44% of agribusiness representative point to a significant increase in the cost of production, which leads to a need to reduce production, and 25% of producers are at risk of stopping their activities.

At the same time, it is necessary to point out the significant differentiation in the influence of military actions on the activities of agricultural enterprises depending on their geographical location. Thus, 10–15% of agricultural enterprises in western Ukraine have already increased their production volume by 2022. The aggressor's occupation of part of the Ukrainian territory became the most significant factor in the impact of the war on the agricultural sector. In unoccupied territories, the vast majority of agricultural enterprises continue to function and satisfy domestic consumers and global demand for agricultural products.

At the same time, the level of challenges of war necessitates a significant change in management approaches to the organization of agrarian businesses, changes in the structure and directions of production, identification of risks, and implementation of methods for neutralization.

2. Literature review.

Scientists have studied the peculiarities of agrarian management under crisis conditions, particularly war conditions. Lopatynskyi et al. (2023) analysed agricultural enterprises' direct and indirect losses during the war. Critical changes for agribusiness are given: Negative indicators of food product export and import, a notable decline in global grain prices, and the loss of sales markets due to challenges and modifications to supply chains in logistics, which are crucial alterations for agribusiness, according to the Lopatynskyi et al. (2023), define the objectives of management activity.

Nehrey and Trofimtseva (2022) investigated the impact of war on changes in the volume of agricultural production and analyzed the importance of human capital in agriculture during the war and post-war periods. This conclusion was expanded and supplemented in the present study.

Herasymchuk (2023) studied the process of ensuring the sustainability of agricultural enterprises during war and post-war periods. The need for proper access to water and land resources is indicated as a necessary condition for sustainable activity. However, it is not clear how exactly military actions make this task difficult. The influence of public organizations on ensuring sustainable agricultural production under hostile conditions is exaggerated in Herasymchuk (2023).

Vuychenko (2022) claims that mainly “small and medium-sized businesses suffered losses” from the war and points to the effectiveness of the process approach to the management of agrarian enterprises, which, according to the author, can provide agrarian enterprises with anti-crisis stability. However, the use of this approach under significant risks has not been sufficiently substantiated. Ishchenko et al. (2022) indicate that significant “changes in the economic, market, and legal environment of the functioning of business structures caused by military aggression” require a significant level of adaptation of managers and information support to the needs of management in martial law conditions. This factor was considered in the present study and a mathematical model was developed to provide proper information support for management.

Shevchenko-Perepolkina (2022) grouped the problems caused by the war for the functioning of agrarian business enterprises in Ukraine: “capture and destruction of agricultural territories, lack of seed materials, fertilizers and plant protection products, fuel, issues of technical support and human resources”.

Unfortunately, the author did not rank these problems or determine their relative importance. Shevchenko-Perepolkina (2022), and Mohylnyi et al. (2022) see access to foreign markets as the task of agricultural management in wartime conditions.

Rusan (2022) investigated the “directions of ensuring the sustainability” of agricultural activity in war conditions: direct and indirect financial support of farmers, institutional measures aimed at preserving personnel potential, financial and technical support for harvesting, and ensuring food security of communities. However, the possibilities of state financing during the war are limited; investments in agricultural production, etc., have also suffered a significant reduction, so Rusan’s (2022) approach needs to be refined, which is considered in the present study.

Didur et al. (2023) indicate that during the war, agrarian management's main task was to ensure enterprises' survival. For this, Didur et al. (2023) suggested strengthening institutional measures to support small agribusiness, lifting the ban on using technical means of production without their registration, limiting the use of uncertified seed material, and arranging online assistance with logistics. The sufficiency of such measures must be studied in this study. In addition, Didur et al. (2023) note that “loss of agricultural land and low prices in the domestic market” create uncertainty about whether farmers can recoup their costs in the next season.

At the same time, Volkova et al. (2023) define the main goal as “competitiveness and ensuring the high quality of agricultural products of Ukrainian agricultural enterprises in the conditions of Russian military aggression”. Volkova et al. (2023) also point out that agribusiness needs the right management strategy and approaches in times of war and “serious challenges”.

Panchenko (2023) indicated that the state of war determined the need to strengthen the viability of agrarian enterprises and substantiated the main tasks of management for this purpose. At the same time, both Panchenko (2023) and Volkova et al. (2023) leave the possibility of changing the goal owing to changes in external conditions.

Stakhovych (2023) studied the risks for agricultural enterprises in war conditions. The specified risks are crop losses, “problems with sales logistics and crop sales, risks of damage to stocks, and risks of loss of equipment and crops”. To manage these risks, Stakhovych (2023) proposed an external insurance tool, which needs to be revised given the limited budgetary capabilities of the state during the war and the significant risks for private financial institutions.

Movchaniuk and Diachenko (2023) investigated the factors that negatively impact agricultural enterprises’ activity in war conditions. Petrychenko et al. (2022) and Movchaniuk and Diachenko (2023) also studied the indirect costs of agrarian business due to military aggression. They provided the result of the assessment of these losses. At the same time, the relative importance of negative impact factors has yet to be determined, which does not provide an opportunity to develop a realistic strategy and tactics for managing an agricultural enterprise in wartime conditions.

Malik et al. (2023) investigated the functioning of agrarian microenterprises under martial law. It pointed out the effectiveness of management in micro-enterprises, which, due to “compact production, are more adapted to activities in wartime conditions”. It is indicated that the sustainable nature of the agricultural production of micro-enterprises in the conditions of war is facilitated by their orientation towards the production of niche products.

Foreign researchers also pay considerable attention to the actions of Ukrainian agricultural management during the war. So, Chinese scientists Ma et al. (2022), with the use of modern digital and space technologies, investigated the condition of fallow lands in eastern Ukraine since long-term laying of fallow lands leads to a loss of soil fertility.

Ma et al. (2022) indicated that “in the west of the Kherson region and in the centre of Luhansk, where the war has been going on for a long time, centres of fallows that arose during the war were discovered. This shows that the war had a significant negative impact on the management and development of agriculture”.

The review of research on the specified topic indicated the need for: developing directions and tools for managing agricultural enterprises in war conditions, establishing conditions for changing agribusiness goals, assessing the impact of war on the components of the resource potential of agricultural enterprises.

3. Methodology.

The application of the comparison method made it possible to investigate the use of resource potential during the war and to establish a new resource potential based on the distance of the enterprise from the war zone. The use of the method of analysis and synthesis made it possible to substantiate the need for a quick manoeuvre with the main goals of agrarian enterprises, namely, maximizing competitiveness or business survival (Kotenko et al., 2021). The application of the statistical analysis method made it possible to establish the growth of the share of individual entrepreneurs (IE) in the total number of agricultural enterprises in war conditions. This indicates that the impact of war requires planning a new structure of agricultural production using the theoretical analysis method. A model was created by applying the mathematical method, which allowed agribusiness to shift its objective from enhancing competition to guaranteeing corporate sustainability (Perevozova et al., 2021).

For this, scientists used the definition of a scale for assessing the degree of risk, according to which 25% is a feasible level of risk, up to 50% is acceptable, and the bankruptcy limit is 70% (Golovko, 2020). Golovko (2020) does not distinguish between the limit values of integral and isolated risk coefficients for this assessment. Also, the war led to the need to take into account the dynamic risk of a catastrophic level, under the influence of which the further functioning of the enterprise is highly complicated or, in general, impossible.

In particular, in the scientific literature, little attention has been paid to such a risk as the impossibility of carrying out agricultural work in the time determined for this by technological conditions. This time in agriculture is often limited, and the loss of the ability to carry out agricultural work in this short period can mean the loss of crops or livestock. That is, the growth to a catastrophic level in a short time of just one such military risk can lead agribusiness to bankruptcy. A new long-term risk is the loss of soil fertility, which is considered in the presented mathematical model.

When developing this model, a set of risks was considered a heterogeneous dynamic sequence. The weight of each of the risks was determined by the size of the area S in Cartesian coordinates under the graph of the function of their change γ in the time interval: $\delta t = t_1 - t_0$. Moreover $\delta t \in \Delta t = t_1^* - t_0^*$, where Δt is the time interval during which the necessary technological operations must be performed, t_1, t_0, t_1^*, t_0^* , are the limits of the isolated and wide time intervals. Then:

$$S = \int_{t_0}^{t_1} \gamma dt \quad (1)$$

The dynamic change of risks requires focusing not only on their current absolute value, but also on the rate of their change over time ($\frac{d\gamma}{dt}$), the assessment of which will make it possible to predict the value of the isolated risk (γ_1^*) at a given moment in time

$$t_1^* : \gamma_1^* = \frac{d\gamma}{dt} * (t_1^* - t_0) \quad (2)$$

It is proposed to determine the value of irregularity of sequences of isolated risks by their weight and distribution density (λ) for a specific technological (production) operation or their set. Then the integral risk (A) is defined as:

$$A = \sum_k \sum_{i=1}^{i=\max} P_i * \gamma_{ki}^* \begin{cases} P_i = \{0, n_i \leq n_k / 1, n_i > n_k\} \\ P_i = \{1, S_i > S_k / 0, S_i \leq S_k\} \end{cases} \quad (3)$$

where P_i is the degree of orderliness of isolated risks for the n_i -th technological operation or their set; i is the index of the operation or their set; k is the number of risks in an ordered sequence, S_i is the current value of the impact weight; S_k is the smallest value of the impact weight that must be taken into account.

If the distribution density λ is greater than the specified maximum value ($\lambda \geq \lambda_{max}$) the degree of order $P_i = 1$. For the value of integral risk $\Lambda \geq 50\%$ the strategy of agribusiness aimed at ensuring competitiveness is replaced by the strategy of survival of the enterprise.

To increase the effectiveness of crisis management, first of all, when implementing the goal of increasing competitiveness, it is proposed to implement such a tool as the Shannon-Weaver mathematical model (Kuzyk, 2022; Hutorov et al., 2021).

4. Aim and tasks.

The study aims to develop directions and tools for managing agricultural enterprises in the conditions of war in Ukraine.

This refers to the process of formulating and solving the tasks that follow: development of a mathematical model of operational change of the goal of an agro-enterprise under the dynamic influence of risks; establishment of conditions for changing agribusiness goals; determination of wartime requirements for managing an agricultural enterprise; assessment of the impact of the war on the components of the resource potential of agricultural enterprises.

5. Results.

The main directions of management activity in the agricultural sector before the start of full-scale aggression were to ensure an increase in production volume, innovative development of the enterprise, expansion of developed markets, access to new markets, and provision of state support. The actions of the management at that time were aimed at realizing the sustainable functioning of the value creation mechanism, which included: infrastructure reconstruction, provision of production activities: labour resources, technologies, machinery, fuel and lubricants, fertilizers. Also, agribusiness needed state support not only in providing subsidies, benefits, and financial resources but, most importantly, in ensuring stable business conditions, simplifying cross-border transportation, ensuring investment activities, and reducing the unpredictability of external factors.

This was consistent with one of the main goals of agribusiness in peacetime, such as strengthening competitiveness.

The scientific community has established approaches to the formation of the competitiveness of agricultural enterprises: resource, market, institutional, focused on competitors; identified sources of competitiveness: resources, key competencies, management, innovation, assets, cooperation, and marketing. Competitive advantages are formed by implementing effective economic mechanisms, innovative development, and proper use of existing potential (Danko & Sliusareva, 2020). To assess the competitive potential of the enterprise, the following must be taken into account: its geographical, spatial, and natural capital; consumer prospects; client base; position in promising areas of the competitive environment, in particular for the diversification of sales markets; human resources; infrastructure quality: property, primarily land assets; financial reserves (Orel & Nevmerzhiyskiy, 2020).

The war conditions did not change the specified provisions but significantly changed their relative importance. In particular, maintaining competitiveness by reducing the price in conditions of significant uncertain risks during the war is very limited. Also, the conditions of a full-scale war indicated the limitations of the thesis of Hnatkivskyi (2022), Kosovych et al. (2022), and Chikov et al. (2022) that the amount of resources does not determine competitiveness but depends on the permanent application of innovations. As the wartime experience showed, more financial resources must be needed to implement innovations.

Therefore, the competitiveness of agricultural producers in wartime conditions is primarily based on the use of resources, mainly implicit resource potential (Melnyk & Koval, 2021). First of all, this refers to personnel potential as the ability of managers to manoeuvre with logistical flows in the conditions of dynamic changes in military threats to supply their products to consumers and provide production with the necessary material resources. The war creates another resource potential for creating competitive advantages, such as the remoteness of production from the war zone and the influence of military risks on competitors, which in such conditions also requires using the latest approaches to organizational and management measures.

With a significant increase in the level of threats in war conditions, the main goal for a large part of agricultural producers is to ensure the enterprise's survival, which requires management actions. Moreover, this management activity also needs an innovation and investment mechanism (Yefremova, 2023). Only acquiring investments in war conditions requires much greater effort since the military actions also led to a crisis in innovation and investment activities.

This determines the need in crisis conditions, relying on the existing potential, to decide the priority of one of two goals: ensuring the long-term competitiveness of the enterprise or its adaptation to threatening changes in external conditions. This requires acquiring new qualities in agricultural management: adaptability and responsiveness to dynamic changes in threats.

The first quality is that full-scale military operations increased the need for adaptive management of agricultural enterprises, taking into account the challenges of the war and the formation of long-term economic mechanisms given the post-war period.

The requirement of responsiveness to dynamic changes in threats is related to the fact that management in crisis conditions must make and implement management decisions in real-time to effectively level the impact of threats. This is new for agricultural management, which is accustomed to implementing long-term, at least seasonal management measures.

Sets of management tools for achieving the stated goals are different, and each tool's importance in achieving one goal also varies. For example, increasing competitiveness requires the development and purposeful use of a marketing strategy. The importance of marketing reduces the degree of uncertainty in agribusiness's market strategy, increases adaptability to crisis conditions, stimulates sales, and enabling agribusiness to gain competitive market advantages (Bahorka & Yurchenko, 2023). However, the importance of strategic marketing in terms of enterprise survival is significantly reduced. At the same time, the need to choose a priority goal does not exclude the possibility of management actions that ensure a different level of proximity to achieving the result for each goal.

This requires introducing a compromise approach and a dynamic management of priorities. The need for operational management of priorities under dynamic changes in external conditions requires a permanent assessment of the level and direction of threats, a variable forecast of the development of events over time, and an analysis of the effectiveness of management decision options, which can provide an opportunity to achieve various goals with limited resources.

Thus, if the achievement of agribusiness goals relies more on the effective use of the factors mentioned above in peacetime, then in wartime, the most important direction of activity becomes minimising the impact of direct and indirect threats from military actions. The management of agricultural enterprises under war conditions must take into account and eliminate negative factors (The Institute for Economic Research and Policy Consulting, 2022), which can be stratified by the magnitude of their impact as follows: The increase in prices for components, fertilizers, and other materials makes up 55%; the lack or irregular supply of fuel and lubricants makes up 54%; difficulties with logistics make up 44%; the lack of labour resources makes up 39%; the lack of working capital accounts for 36%; the increase in military hazards for the performance of production processes is 34%; damage to property and products is 7%. Military actions made it extremely difficult to restore agribusiness in the liberated areas due to: mine contamination of agricultural land or its direct destruction; destruction of irrigation infrastructure; removal or destruction of agricultural machinery; purposeful destruction of elevator complexes; destruction of livestock; and removal of agricultural products by the aggressor, primarily stocks of grains.

Institutional measures limited to wartime conditions, such as providing soft loans to agricultural producers for land demining, need to be revised. A combination of private, state, and international organizations is needed to fully recover agribusiness in liberated areas. The basis of the resource potential on which the management of agricultural enterprises is based has always been land (Stepanenko & Vlasenko, 2022).

The possibilities of strengthening this potential to increase the competitiveness of products and the sustainability of production are due to the following circumstances: to date, the national volume of 42,000 thousand ha of agricultural land has been distributed as follows: in private use, 75% of the land; in state ownership, 24%; in communal ownership, 1.06%; and in collective ownership, 0.04% (Shelenko et al., 2022).

The distribution of the state-wide land volume led to an increase in the share of sown areas under grain and leguminous crops and a significant decrease in the share of sown areas under fodder crops. This led to an imbalance in the crop and livestock sectors, in particular, to a decrease in the volume of organic fertilizers, which has the consequence of an imbalance in crop production.

With the continuation of this management approach to land use, the productivity of the land will decrease, and, accordingly, the yield will decrease, resulting in the loss of financial sustainability for agricultural enterprises. This requires agricultural management to introduce

appropriate economic mechanisms, in particular, to increase cooperation.

The cooperative is able to provide agricultural enterprises, primarily individual entrepreneurs, with a small land resource, more significant opportunities in land use, and, in particular, more effective implementation of crop rotation. Cooperation will also increase the possibilities of forming a logistics infrastructure, its dynamic management, which is essential in the event of military threats to transport routes, and the possibilities of forming an infrastructure for the storage and processing of agricultural products (Vitkovskiy, 2019). The war also changed the conditions for acquiring land resources. Thus, the risks of war led to uncertainty regarding long-term capital investment in land resources by influential investors. On the other hand, due to full-scale military operations, the supply increased due to, in particular, the impoverishment of the population and, first of all, the owners of small plots of land. This is also evidenced by a 25% decrease in the size of alienated land since the beginning of the war (Table 1).

Table 1. Number, area and average value of alienated land plots.

Month, year	Quantity, units	Area, ha	Average cost of 1 ha, UAH
July. 2021	3125	4707,91	87881,24
July. 2022	5276	8934,78	40743,01
July 2023	8634	16929,98	44200,46

Source: based on State Service of Ukraine for Geodesy, Cartography and Cadaster (2023).

This led to a decrease in the value of one hectare by more than half. The consequence of this was a rapid increase in the number of land sales transactions and the area of alienated land plots, which is evidence of the acceleration of the redistribution of land ownership (Table 1). The land market also stimulates the fact that acquiring the necessary liquidity of assets to ensure the financial stability of the land fund by small agricultural enterprises is a practical direction. Before the full-scale aggression, the scientific community was dominated by the opinion that large agricultural enterprises, with their more extensive land, material, and financial resources, have a higher level of competitiveness than medium and small producers, and, accordingly, their potential opportunities for acquiring a sustainable nature of activity are more excellent.

The war showed the vulnerability of large agricultural enterprises owing to the significant concentration of fixed assets, mainly in the southwestern regions of Ukraine. The agrocluster A.G.R. The group in the Mykolaiv region was destroyed, and the irrigation system, which the enemy converted into fortifications, required reconstruction, which would require significant financial resources for the agricultural cluster. The entire bird population at the Chornobayiv poultry factory of the Ukrland Farming Company was completely destroyed. The issue of this ecocide was raised during a session in the U.N. General Assembly. The resources and equipment of the companies "Agroton" and "NIBULON" in the Luhansk region have been appropriated by the Russian company "Agrocomplex named after Tkacheva".

HarvEast lost seed plants and 95,000 hectares of land near Mariupol. This requires large companies' management to attract significant financial resources, relocate part of their production facilities and take other anti-crisis measures. So, to avoid destruction, the elevator and warehouse facilities of Eridon, LNZ Group, and VITAGRO were transferred to European countries. The thesis about the growth of the share of large farms in the agricultural sector led to conclusions about the increased social tension in rural regions due to the predicted bankruptcy of small and medium-sized businesses. Since the peculiarity of the organizational structure of the country's agricultural industry is characterized by a significant share of small and medium-sized enterprises, which are primarily individual farms engaged in mainly labour-intensive areas of agricultural production, this caused concern. A significant share of individual farms in agricultural production is explained by the population's efforts to gain economic independence and social self-realization in the

conditions of the economic and political crises of the 1990s and 2000s. Natural production on the homestead or country plot, in which about 30% of Ukrainian families were engaged, has been replaced by a market-oriented small-family agribusiness. State support, which by definition distorts the market, in particular payments and benefits to agricultural producers, was significantly minimized for individual agricultural production, which at a certain time slowed down the development of small and medium-sized agricultural enterprises, but this also became the reason for their viability and competitiveness under crisis conditions.

This led to the formation of a social community of self-sufficient citizens engaged in agricultural production and, as the research showed, the share of individual entrepreneurs in the total number of agricultural enterprises increased by a total of 19.8% as of the end of 2022 (Fig. 1). The growth of the specified share of individual entrepreneurs is typical for all types of agricultural activity.

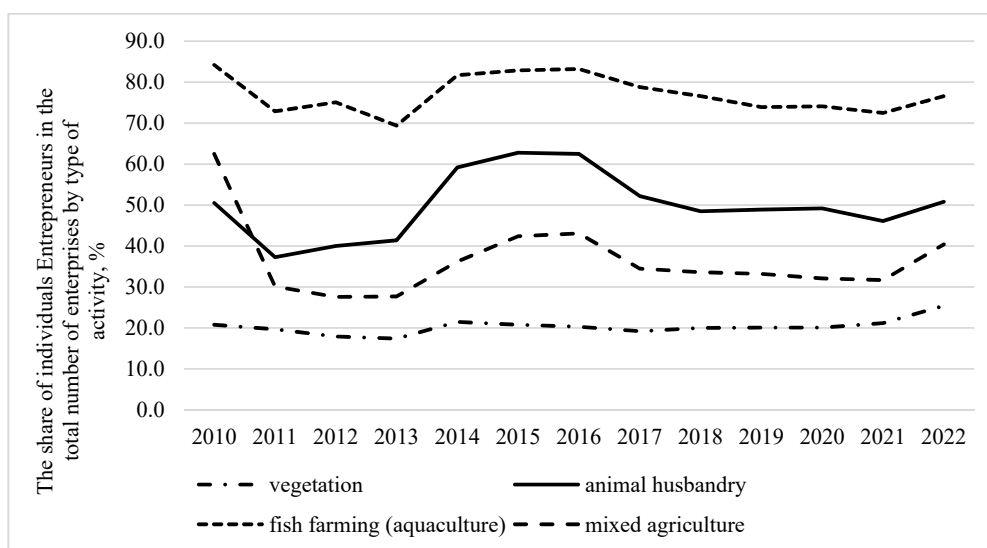


Fig. 1. Dynamics of the share of private enterprises in the total number of enterprises by type of activity, %.

Source: based on the State Statistics Service of Ukraine (2023).

This growth was more significant in labour-intensive types of agricultural activity, mainly by small and medium-sized farms. Thus, in fish farming, the share of IE in the total number of enterprises increased by 18% in 2022 compared to the previous year (Fig. 1). This is also a consequence of non-bureaucratic

management, which quickly generates solutions and immediately implements them, the ability of the IE to take responsibility and a greater level of leadership qualities of management.

A significant challenge for agricultural management is the deterioration of the provision of such resources as labour resources.

The decrease in the provision of labour resources has long-term and short-term dimensions related to military actions (Koval et al., 2022). The long-term negative situation with labour resources is evidenced by changes in industry labour productivity (Butko et al., 2019).

Before the full-scale aggression, despite inevitable fluctuations of this indicator associated with the change of harvest and non-harvest periods, labour productivity in the industry had a long-term tendency to deteriorate (Fig. 2).

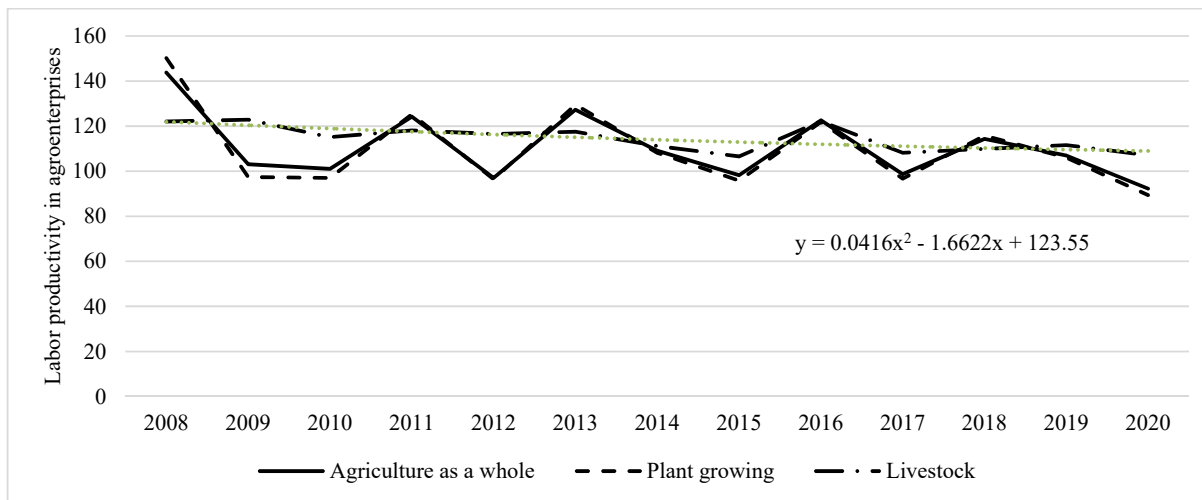


Fig. 2. Dynamics of labour productivity in agricultural enterprises by type of activity, per employee, in constant prices of 2016; thousand hryvnias.

Source: based on the State Statistics Service of Ukraine (2021a).

A characteristic peculiarity of labour productivity is also the significant sectoral difference between this indicator and the difference in long-term sectoral labour productivity trends. Thus, the slope ratio of the trend, which indicates the rate of decrease in labour productivity in animal husbandry, is approximately 1.08, and that in crop production is approximately 1.73. The reasons for this have been stated above. During the war, the situation with labour resources significantly worsened (Nikolchuk & Lopatovska, 2023). This is evidenced by the negative migration balance of 8 million citizens from 2022 to 2023. The migration balance includes 2.9 million people deported by the occupiers to the territory of the Russian Federation during the full-scale war. It is necessary to add another two million citizens who left to earn money in previous periods and to take into account that a significant part of this number was the inhabitants of the village. Mobilization also covered a significant proportion of the working-age rural population, due to which the agricultural industry lost qualified personnel, primarily mechanics and drivers.

This creates additional risks in agribusiness and increases costs because scarce personnel require a higher level of payment.

This also determines the need for agrarian management to acquire the ability to form personnel policies in crisis conditions. Thus, with the mobilization of qualified personnel, the management of large agricultural enterprises introduced corporate programs for women to acquire knowledge in deficient professions, mainly mechanics, motor vehicle drivers, and warehouse truck loaders.

Military actions in the agricultural sector also led to a significant reduction in the process of updating the equipment park. The volume of imports of agricultural equipment was reduced by 30–35% (Sas & Mykolaichuk, 2023).

Since at the beginning of full-scale hostilities, 75–80% of households were equipped with modern equipment (Mostova, 2023), the specified reduction in the renewal process is significant mainly for areas covered by hostilities. Financial resources are also one of the key factors in the agricultural industry.

Before the full-scale aggression, the financial instrument for ensuring sustainable agribusiness financing under the uncertainty of the effects of risks was insurance (Trusova et al., 2021).

The use of insurance companies and banks for this resulted in a significant decrease in the operational and financial resources of agricultural enterprises, which was a problem even for powerful agricultural holdings. Therefore, large and medium-sized agricultural enterprises resorted to self-insurance and formed their insurance savings, which were formed from depreciation funds and retained earnings.

However, the significant negative impact of the war and the long-term effects of military risks indicated the insufficiency of accumulated insurance resources for a significant number of large and medium-sized agricultural enterprises. State financial assistance to farmers, in particular, under the program "Affordable Loans 5-7-9" aimed at supporting small and medium-sized enterprises, is limited in scope due to the need to finance defence measures. This requires agricultural management to have considerable flexibility in managing finances, reducing accounts payable, and creating the possibility of securing loans with liquid assets, such as land, resources, etc.

Implementing an effective economic mechanism in management practice is possible only in the case of a comprehensive approach to forming systemic prerequisites for the activity of agricultural enterprises.

The components of this approach should be: the level of cooperation with other subjects of economic activity and acquiring the support of institutional structures; the choice of a productive direction of the enterprise's activity; a strategy that takes into account anti-crisis, innovative, economically and socially appropriate directions of management measures to ensure appropriate levels of competitiveness and sustainable development; adaptive tactics of the enterprise to acquire the necessary flexibility to external influences; appropriate adjustment of marketing, logistics, accounting activities; formation of appropriate financial and resource support; effective management of the

enterprise by: rational establishment and ranking of activity goals; permanent assessment of available opportunities and conditions of achievement; formation and implementation of management decisions aimed, on the one hand, at achieving set goals and, on the other hand, at forecasting risks and adapting to unexpected external influences.

Due to the risks of war and constant air and sea attacks on Ukrainian grain exports, the agricultural sector needs to plan a new structure of agricultural production with the participation of institutional structures and representatives of large, medium and small businesses, taking into account export opportunities and the tasks of ensuring the domestic market.

The need for a balance of crop production and livestock production, the need to load food enterprises, etc., must also be considered. At the same time, the issue of priority financing of the production of highly profitable and low-tonnage products should be considered, which will reduce the risks of agricultural exports and ensure income to the state budget. The development of a new structure of agricultural production should be implemented, taking into account the remoteness of the regions from the war zone and the security of agricultural enterprises from military risks.

6. Conclusions.

The dynamism of changes in external conditions during the war creates the need to ensure, if necessary, rapid manoeuvring of the specified goals.

This dynamism is also due to a new type of risk, such as the impossibility due to military risks of carrying out agricultural work at the specified time. This time in agriculture is often limited and the loss of the opportunity to carry out agricultural work within a certain period may mean the loss of crops or livestock. That is, the growth of just one such war risk to a catastrophic level in a short time can lead agribusiness to bankruptcy. This requires an operational change in the goals of agribusiness management.

A mathematical model has been developed for quick manoeuvring of the named targets.

It is indicated that the achievement of the mentioned goals requires the acquisition of new qualities by agricultural management: adaptability and responsiveness to dynamic changes in threats.

The first quality is due to the fact that full-scale military operations increased the need for adaptive management of agricultural enterprises taking into account the challenges of the war and the formation of long-term economic mechanisms in view of the post-war period.

The requirement of responsiveness to dynamic changes in risks is related to the fact that management under crisis conditions must make and implement management decisions in real-time to level the impact of threats effectively. Such management approaches are new for agricultural management, which is accustomed to implementing long-term, at least seasonal, management measures.

Factors affecting agribusiness under martial law were determined and stratified by size. The evaluation of the resource potential components of agricultural businesses was conducted. An evaluation of the sales of alienated land plots was conducted based on their number, area, and average value as land has historically been the foundation of agricultural enterprises' resource potential.

During full-scale military operations, the proposition of land plots increased, particularly the impoverishment of the population, first of all, the owners of small land plots. This, in particular, is evidenced by the decrease in the size of alienated land plots since the beginning of the war by 25% and the decrease in the value of one hectare by more than half. This made it possible to speed up the redistribution of land ownership even under war conditions.

Statistical data confirmed the long-term negative trend of decreasing labour productivity in the industry. It is noted that a peculiarity of labour productivity is also a significant sectoral difference in this indicator and, moreover, a difference in long-term sectoral labour productivity trends. The trend shows a decrease in labour productivity in animal husbandry by a slope ratio of approximately 1.08 and in crop production by a slope ratio of approximately 1.73.

The results of the statistical analysis are presented, which testify to the increase in the share of individual entrepreneurs in the conditions of war.

According to data from the end of 2022, the share of individual entrepreneurs in the total number of agricultural enterprises will increase by 19.8%. The increase in the share of entrepreneurs is typical for all types of agricultural activity. However, it was more significant in labour-intensive agricultural activity, mainly by small- and medium-sized agricultural enterprises. Thus, in fish farming, the share of entrepreneurs in the total number of enterprises will increase by 18% in 2022 compared to the previous year.

This indicates the viability of small agricultural enterprises in particular. The reasons for the viability of small enterprises are indicated, in particular, such features of their management as quick generation of decisions and their immediate implementation, the ability to take responsibility, and a higher level of leadership qualities in their management.

Implementing an effective economic mechanism in management practice is only possible in the case of a comprehensive approach to forming systemic prerequisites for the activity of agricultural enterprises. The components of this approach were determined.

The influence of the war requires improvement in the structure of agricultural production with the participation of institutional structures and representatives of large, medium, and small businesses, taking into account export opportunities and the tasks of ensuring the domestic market, taking into account the need for a balance between crop production and livestock production, the loading needs of food enterprises, and so on. Simultaneously, the issue of priority financing for the production of highly profitable and low-tonnage products should be considered, which will reduce the risks of agricultural exports and ensure income to the state budget. The development of a new structure of agricultural production should be implemented by considering the remoteness of the regions from the combat zone and the level of influence of military risks on the production of agricultural enterprises.

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