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**Vegetable Production in Ukraine in the Context of Economic Instability:
Forecast and Future Prospects**

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Abstract. *The agricultural sector of Ukraine is currently one of the few sectors of the economy that, despite the significant problems of the state's financial development in the context of the war, demonstrates relative functioning stability. In line with food traditions and the availability of fertile land in Ukraine, the vegetable growing industry is well developed, accounting for about 20% of total agricultural production in Ukraine. The outbreak of a full-scale war on the territory of Ukraine poses challenges to vegetable producers. It requires them to intensify their efforts to maintain production capacity and use their development potential even in difficult economic conditions.*

The purpose of the article is to determine the impact of economic instability caused by the war on vegetable production in Ukraine, as well as to assess the prospects for the development of the industry in the face of current challenges. The study uses statistical analysis and SWOT analysis to systematise the strengths and weaknesses of the industry and identify opportunities and threats. The analysis



showed that in the pre-war period, vegetable production was actively developing, providing significant exports and creating a positive image of Ukraine in international agricultural markets. However, the full-scale war significantly complicated the functioning of producers due to the disruption of logistics chains, lack of financial resources and occupation of large areas. The main weaknesses of the industry are its dependence on weather conditions, outdated equipment, and high credit costs. At the same time, its strengths include significant resource potential, a developed transport system, and government support. The survey results show that development prospects depend on the dynamics of hostilities. Key opportunities include participation in grant programmes, export development and modernisation of production technologies. Threats include the duration of hostilities, rising inflation, and limited access to resources. The conclusions emphasise the need to strengthen state regulation, support domestic producers and use modern technologies to ensure food security in Ukraine.

Keywords: *agriculture, vegetable production, food security, net income, vegetable exports.*

Виробництво овочів в Україні в умовах економічної нестабільності: прогноз та перспективи майбуття

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Анотація. *Агропромисловий комплекс України на тепер є однією з небагатьох галузей економіки, які, незважаючи на значні проблеми фінансового розвитку держави в умовах війни, демонструють відносну*



стабільність функціонування. Відповідно до традицій харчування та наявності родючих земель в Україні, розвинена сфера овочівництва, вона займає близько 20 % всього обсягу виробництва сільськогосподарської продукції в Україні. Початок повномасштабної війни на території України створює виклики виробникам овочів та вимагає від них активізації зусиль для збереження виробничих потужностей та використання потенціалу розвитку навіть в складних умовах економічної нестабільності.

Мета статті – визначити вплив економічної нестабільності, спричиненої війною, на виробництво овочів в Україні, а також оцінити перспективи розвитку галузі в умовах сучасних викликів. У дослідженні використано методи статистичного аналізу та SWOT-аналіз для систематизації сильних та слабких сторін галузі, визначення можливостей та загроз. Проведений аналіз показав, що в довоєнний період виробництво овочів активно розвивалося, забезпечуючи значні обсяги експорту та створюючи позитивний імідж України на міжнародних аграрних ринках. Однак повномасштабна війна суттєво ускладнила функціонування виробників через порушення логістичних ланцюгів, дефіцит фінансових ресурсів та окупацію значних територій. Основними слабкими сторонами галузі визначено залежність від погодних умов, застаріле обладнання та високу вартість кредитних ресурсів, тоді як до сильних – суттєвий ресурсний потенціал, розвинену транспортну систему та державну підтримку. Результати дослідження демонструють, що перспективи розвитку залежать від динаміки воєнних дій. Серед ключових можливостей зазначено участь у грантових програмах, розвиток експорту та модернізація технологій виробництва. Загрози включають тривалість воєнних дій, зростання інфляції та обмеженість доступу до ресурсів. Висновки підкреслюють необхідність посилення державного регулювання, підтримки



національних виробників та використання сучасних технологій для забезпечення продовольчої безпеки України.

Ключові слова: *сільське господарство, виробництво овочів, продовольча безпека, чистий дохід, експорт овочів.*

Statement of the problem in general terms and its connection with important scientific or practical tasks. Agriculture plays a key role in the national economy, as it determines the compliance with norms and requirements of food security, the formation of foreign exchange earnings as a result of exports of agro-industrial products, the availability of jobs for a large number of people (about 17% of the employed population of Ukraine works in agriculture). With the beginning of a full-scale war in Ukraine, the importance of growing vegetables as a component of agriculture increases, because vegetables, according to the mentality and eating habits of Ukrainians, are the basis of the diet. On the volume of grown and harvested vegetables depends largely on the price of the basic food set of Ukrainians, so the analysis of the prospects of development of vegetable production in modern conditions is of particular relevance [3].

Given the importance of vegetable production for the Ukrainian economy, it is necessary to assess the threats and prospects for the development of this area of agriculture in the near future. At the same time, it is necessary to determine how the conduct of military operations may affect further opportunities for the development of this sphere of production. The optimal tool for the analysis of prospects and opportunities is SWOT-analysis, based on the results of processing statistical information and analytical materials. In general, vegetable production refers to agriculture and crop production, so the analysis on the selected topic will be conducted, in accordance with the availability of materials on the development of agriculture in Ukraine and the peculiarities of the development of Ukrainian



enterprises related to this sphere. Consequently, the focus of attention will be on two areas:

-  macro- and meso-economic analysis of the prerequisites for the development of vegetable production in Ukraine;

-  assessment of opportunities and prospects for the development of vegetable production at the microeconomic level.

Research Aim and Research Questions. The work aims to analyze the current state of vegetable production in Ukraine with the formation of a reasonable forecast for further development, given the instability of the Ukrainian economy as a result of military operations taking place on the territory of the state.

Research Methodology. Studies of the problems of the development of certain sectors of the Ukrainian economy are mainly based on a retrospective analysis of statistical data, which involves determining the structure of production of certain types of goods, and for agriculture - of certain crops; analysis of the dynamics of production volumes and foreign trade of various agro-industrial crops. The financial analysis of agro-industrial producers deserves special attention with the determination of the prospects for further development in an unstable environment. To specify the opportunities and threats, as well as strengths and weaknesses of vegetable production in Ukraine it is advisable to use SWOT-analysis. Statistical analysis with the definition of the prospects for further development [20] and the practical implementation of approaches to assess the financial condition of vegetable producers [17] will provide comprehensive solutions and determine the prospects for further development of vegetable production in Ukraine.

The participants of the study, and consequently, the stakeholders can be the state, represented by the Ministry of Agrarian Policy and Food of Ukraine, vegetable producers, contractors involved in the process of production and sale of finished products of this sphere. Further development of the agro-industrial sphere



and the sphere of vegetable production, in particular, requires taking into account the interests of all stakeholders and focus primarily on the requirements of food security of the state in war conditions.

The research tools can be concretized in the form of general scientific and specific methods described earlier. A separate research tool is SWOT-analysis, which allows to specify strengths and weaknesses of vegetable production in Ukraine, as well as opportunities and threats to its development. For the study, we used statistical data [18], indicators of financial statements of producers of agricultural products, particularly vegetables, analytical materials, scientific periodicals, and books.

Analysis of recent research and publications. Since the issues of development of various spheres of the agro-industrial complex have been attracting the attention of scientists for a long period of time, the topic under study has been developed quite deeply, but military actions in Ukraine are creating new challenges for domestic agriculture and require a rethinking of the ways of further development. To date, the literature has identified the key features of the development of the agro-industrial complex in general and vegetable production in particular:

 significant state support and its positive impact on the development of agricultural enterprises are outlined in the works of V.V. Rusaniuk [13], L. N. Vasylieva [14], O. Bondar, I. Polyakova, V. Liakh [8];

 problems with attracting investment resources, which are becoming key for agricultural enterprises in conditions of shortage of financial resources; these aspects are developed in detail in the works of T. A. Hutsul et al. [3-4];

 the need to use modern technology to improve the efficiency of agricultural production is considered in: I. Brovdi [2];

 the influence of the state on the agricultural market and the formation of prerequisites for further promotion of Ukrainian products to world markets are considered in the works of V. Melnyk [15] and V. Petrychenko et al. [17].



However, despite the considerable attention of domestic and foreign scientists to the problem of development of vegetable growing and agro-industrial complex in Ukraine, today the realities of the external environment create prerequisites for new scientific research [3; 4]. Therefore, the problem of analysing the prospects for further development of the vegetable growing sector in Ukraine is quite acute and may become a promising area of research.

Identifying previously unresolved parts of the overall problem. Despite significant advances in the study of vegetable production under conditions of economic instability, some aspects remain insufficiently researched. One key issue is the impact of military operations on supply chains. Restoring transport infrastructure, especially in regions that have suffered significant damage, requires further research. It is important to assess how these changes affect the supply of produce and the supply of vegetables to the domestic market.

Another aspect is the insufficient use of modern technologies in vegetable production. Many enterprises remain dependent on outdated equipment, which reduces their efficiency. The introduction of innovative methods, such as the automation of production processes and the introduction of monitoring systems, could significantly increase the competitiveness of Ukrainian products.

The problem of financing also remains relevant. Insufficient grant support and limited access to international financial resources create industry development barriers. An in-depth study of ways to attract foreign investment and grant programmes could help solve this problem.

In addition, the issue of assessing enterprises' economic efficiency requires attention. Many companies face challenges in optimising resources due to high production costs and the unstable economic situation. An analysis aimed at identifying reserves for increasing profitability will help companies find ways to improve their financial performance.



Thus, the proposed study aims to overcome these gaps by developing new theoretical models and applied solutions. Addressing these issues will not only contribute to the industry's recovery but will also ensure the sustainable development of the agro-industrial complex in the face of economic instability.

Presentation of the main research material with full justification of the scientific results obtained. The Ukrainian agro-industrial complex unites sectors of the national economy associated with the production and processing of agricultural products, as well as their material and technical support.

Currently, agriculture as a strategic sector for the Ukrainian economy under martial law has a number of features, which are also reflected in the results of the industry enterprises:

- 1) significant influence of weather and natural factors on the performance of enterprises;
- 2) fluctuations of land yields under the influence of weather factors and depending on the properly chosen strategy of land cultivation;
- 3) the need for constant cyclic preparation of land for the cultivation of different types of crops;
- 4) the need to use specific agricultural machinery for growing agro-industrial products
- 5) significant duration of the production cycle due to the specificity of the production process
- 6) the constant need to use significant amounts of resources, which in war conditions become especially scarce;
- 7) the need to create special conditions for the transportation and storage of finished products for the new harvest.

The main direction of Ukrainian agriculture is crop production (about 74% of agricultural production) (Figure 1). Sunflowers lead in the east, wheat is added to it



in the south, wheat, fruits, and berries dominate in the west, and more corn is grown in the northern region.

As can be seen from Fig. 1, vegetable production accounts for 20% of all production in the agro-industrial complex of Ukraine. This, once again, emphasizes the extreme importance of this area for the state's economy. Also, the strategic importance of the agro-industrial complex emphasizes the volume of exported products (Fig. 2), thereby creating a positive image of Ukraine on world agricultural markets and generating foreign exchange earnings for the state. The structure of gross agricultural production in Ukraine is based on the types of the most important components of crop and livestock production in 2021 (Figure 1).

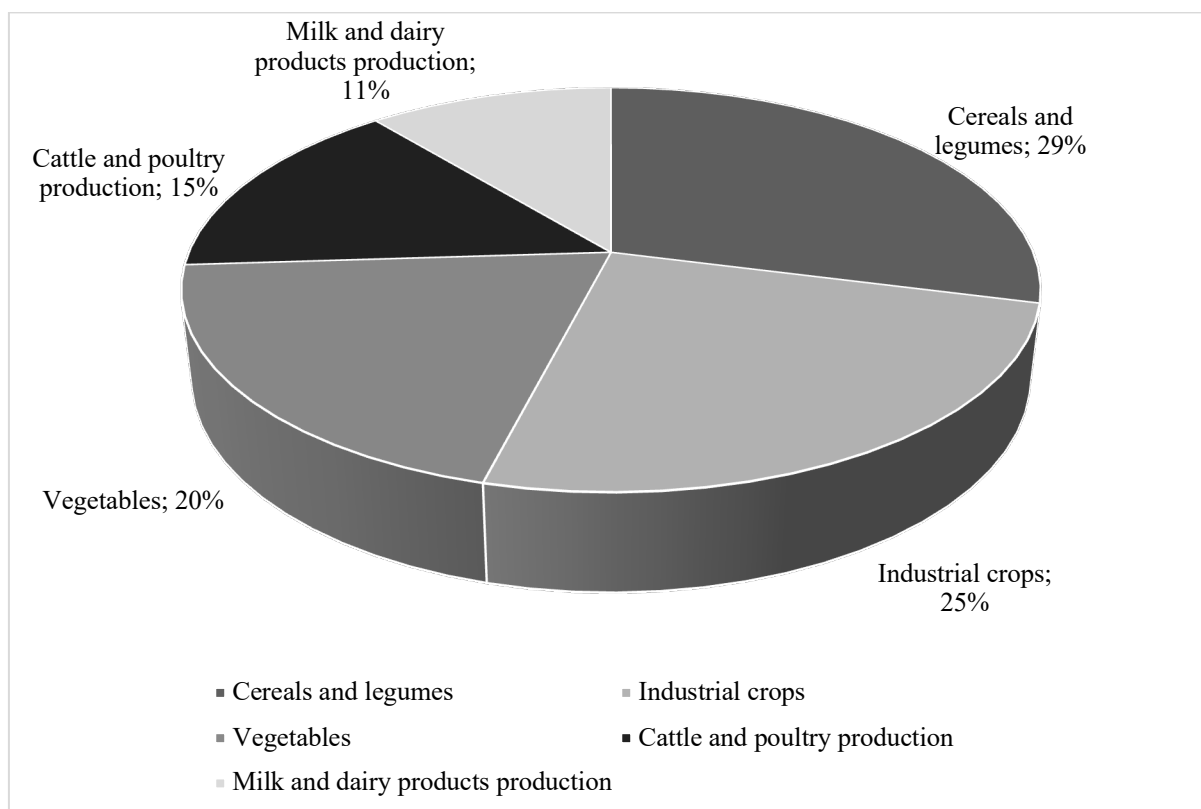


Figure 1. Structure of agricultural production in Ukraine by product type in 2021

Source: compiled by the author based on the State Statistics Service of Ukraine [18]

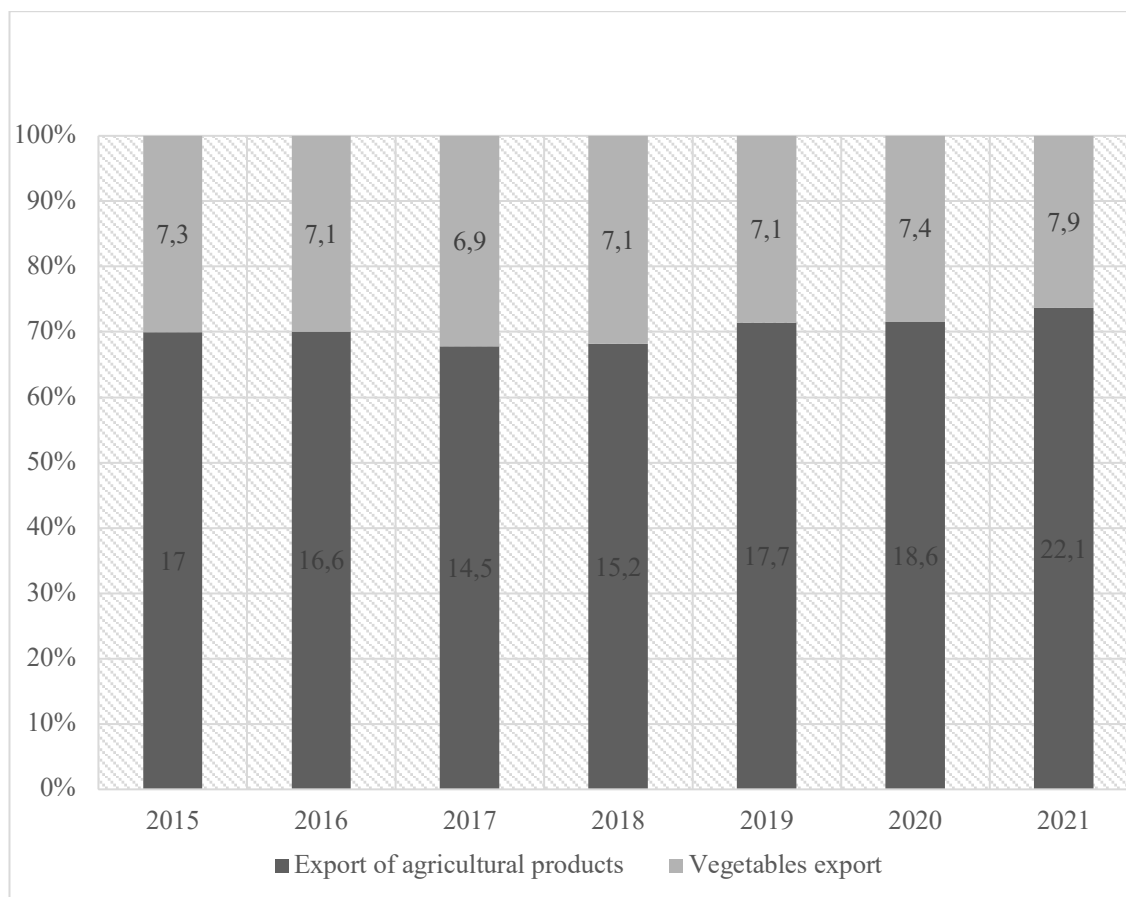


Figure 2. Dynamics of agricultural exports of Ukraine in 2015-2021, bln. UAH

Source: compiled by the author based on the State Statistics Service of Ukraine [18]

The steadily growing export volumes in the last three years, in general, and the area of vegetable growing, in particular, indicate a significant interest in Ukrainian products on the international market. However, with the beginning of a full-scale war on the territory of Ukraine, the implementation of exports is complicated due to the blocking of ports and disrupted railway connections. Over the last five years, the vector of Ukraine's agricultural product sales has changed its orientation towards Asian and EU countries, according to the State Statistics Service of Ukraine. (2022), the share of each of these regions is 38% and 29%. Smaller export volumes are focused on CIS countries (13%) and Africa (18%). Grain crops and vegetables form the basis of exports. As was proved by the data shown in Fig.



1, vegetable production occupies a significant place in the agricultural sector of the economy, and the most popular vegetable for growing in Ukraine stably remains the potato - Fig. 3. Based on statistical data, we see that potato production in Ukraine exceeds the total output of all other types of vegetables, which means that potatoes can be called a strategically important product for the national economy.

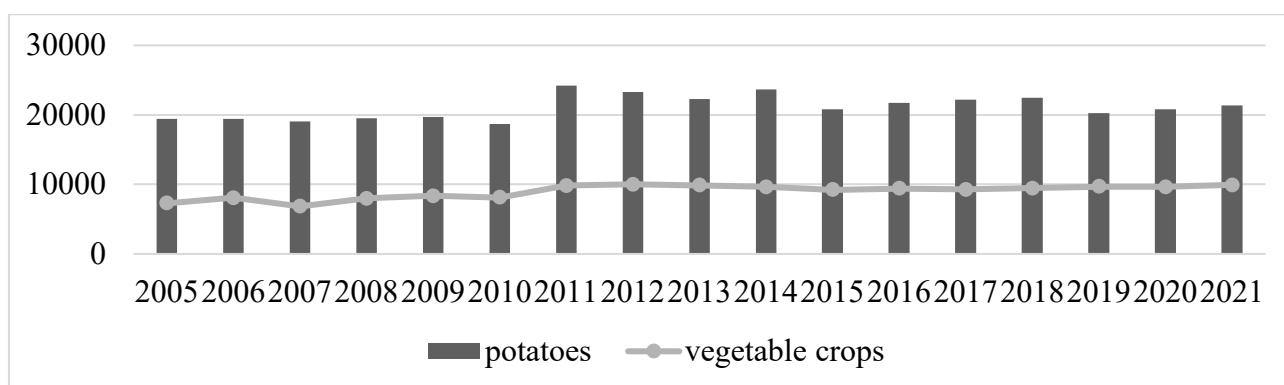


Figure 3. The volume of production (gross harvest) of agricultural crops, thousand tons

Source: compiled by the author based on the State Statistics Service of Ukraine [18]

After conducting a meso-economic analysis of the vegetable production sector, it is logical to move on to assessing the situation at the microeconomic level, to determine how vegetable producers plan and implement their financial activities and what reserves of survival they have in the conditions of hostilities. For the analysis, nine business entities were selected that specialize in growing vegetables and supply them to both domestic and foreign markets. Basic financial indicators for these enterprises are presented in Table 1.



Table 1

Basic financial indicators of vegetable producers in 2021

Enterprises of the industry	The volume of products sold, thousand UAH	Product profitability ratio, %	The volume of net profit, thousand UAH
Peasant farming enterprise "Promin"	54802	1,00	137
PJSC "Peasant farming enterprise "Seleksiia"	6779	3,41	1697
PJSC "Agricultural enterprise "Shubkivske"	14321,2	-43,86	-299,9
PJSC "AE Nadiia Nova"	45717	1,00	24147
PJSC "Agricultural enterprise "Dmytrivka"	94,2	0,00	20,6
Agricultural private joint stock company "Niva"	1079,7	-0,91	-1050,3
Agricultural private joint stock company "Volodymyragro"	541,9	-2,49	-17,4
LLC "Plodoriddia"	1671	8,72	90

Source: author's development

Enterprises, the results of activity of which are presented in Table 1, can be considered as typical representatives of the vegetable production industry. We see a general trend, according to which these enterprises are either unprofitable or have extremely low profitability indicators, indicating the inefficiency of their functioning. We can assume that under martial law, the situation will only get worse, as the significant depreciation of the hryvnia relative to world currencies, combined with high inflation rates, will further complicate the work of producers. This will affect their ability to purchase fertilizers, seeds, and other critical resources necessary for production continuity.

Taking into account the diagnosed problems in the financial performance of the typical representatives of the branch and the assumption that such problems are inherent to the majority of companies, we suggest forming a matrix of SWOT-analysis for vegetable producers in Ukraine, specifying their strengths and weaknesses, as well as identifying the opportunities and threats to development in the martial law conditions. This approach will enable a comprehensive assessment



of the industry's current state and provide strategic insights into addressing the pressing challenges. Table 2 illustrates the key components of this analysis.

The SWOT-analysis conducted in table 2, allows for summarizing the main trends in the development of vegetable production in Ukraine, in particular, even in difficult conditions of military operations, vegetable production enterprises have the prospects for development and the potential to use the opportunities and strengths. For the state, the implementation of support for agro-industrial producers is one of the priority tasks along with the financing of the Armed Forces of Ukraine since the observance of food security norms in the country depends on the performance of the agro-industrial complex.

Table 2

SWOT-analysis matrix for vegetable producers in Ukraine

Strengths	Weaknesses
significant potential for production and financial development; Availability of significant land areas for growing vegetables; A positive image of Ukrainian producers in the world market; an extensive transport system in Ukraine that allows to quickly transport vegetables between regions; stable demand for the products; in comparison with European countries, cheap labor and low production costs; availability of state support programs for producers of agro-industrial products	significant dependence on weather conditions and environmental factors; the need for state support; the need to invest in the sowing period, at a time when the input cash flow from the sale of finished products is formed after a long interval of time; outdated equipment, agricultural machinery, the renewal of which cannot always be financed from the enterprise's own funds; high cost of capital for domestic enterprises
Opportunities	Threats



If the war on the territory of Ukraine ends or de-escalates, it will be possible to develop vegetable production in the de-occupied territories; The openness of world markets for Ukrainian products and the positive image of producers create prerequisites for export development; Potential participation of Ukrainian vegetable producers in grant programs of Western partner countries will allow financing of economical production and purchase of modern agricultural equipment; Rising prices for foodstuffs of animal origin will provoke growth in the consumption of vegetables Potential growth of exports and receipt of currency earnings will allow upgrading the technology of vegetable production and land cultivation	Continuation of military actions on the territory of Ukraine will worsen the situation of vegetable producers due to the lack of funds for state support and the deterioration of the financial state of the state; occupation of large areas of Ukraine will exclude the possibility of further development of vegetable production at the level that is present in Ukraine today; Further growth of inflation may lead to difficulties with the financing of seeds and fertilizers purchase; deterioration of the financial state of the state will lead to a shortage of financial resources in vegetable-producing enterprises
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Source: author's development

Ukrainian agriculture today, without exaggeration, is one of the most powerful in Europe, thanks to the availability of significant crop areas and fertile soils. Understanding the significant potential of the agro-industrial sector, the state provides active support to producers in this area, which yields positive results [1; 4; 5; 7; 10-12]. For Ukrainian vegetable producers today, the external environment poses significant challenges; in particular, the beginning of military action in Ukraine has led to significant risks of further development. Some enterprises were under occupation; some were forced to reduce production due to constant shelling, and some producers reduced production volumes. However, most enterprises, in general, and vegetable production, in particular, continued to function. In the pre-war period in Ukraine, there were active developments and research on the development and intensification of production processes in the direction of vegetable growing [9; 16], which today give positive results, and Ukrainian vegetable producers have a positive image in international markets. It should be noted that the global trend to consume more plant foods [21] also actualizes the



importance of vegetable production in Ukraine. Undoubtedly, the prospects of developing the vegetable growing sector will depend on the state of military conflict in Ukraine's territory and the prospects of recovery of the national economy after the end of the active military phase. However, it can be argued that in Ukraine, the sphere of vegetable growing will always be in demand because vegetables, particularly potatoes, are a strategically important product for the domestic economy and play one of the leading roles in ensuring the state's food security.

Conclusions and Implications. It is concluded that agriculture is one of the key sectors of the economy, playing a significant role in shaping Ukraine's economic potential. This sector contributes to the state budget and ensures the balance between production and consumption. Regarding vegetable production, as a component of agriculture, the current state of Ukraine's economy presents threats and potential opportunities, which have been systematically analysed using SWOT analysis. Overall, it is determined that the prospects for further developing vegetable production in Ukraine will largely depend on the dynamics of the military conflict. However, prerequisites for recovering the domestic market and expanding into international markets are evident.

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