DEVELOPMENT OF THE AGRICULTURAL SECTOR AND ENSURING FOOD SECURITY IN THE CONDITIONS OF WAR

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Abstract: It has been proven that the production of grains and legumes may decrease by up to 30% compared to 2021. Wheat production is expected to decrease by 34%, barley by 45%, and corn by 2%, respectively. However, this will not influence the satisfaction of domestic demand for grain and legume products. By the way, buckwheat production by reseeding and changing the structure of crops will make it possible to fully meet the needs of the population and get some residues. As for industrial and other crops, production is expected to decline by up to 30% and sunflower by up to 34%, respectively. The practice of vegetable gardening, popular in the 1990s, becomes relevant again. More and more citizens mention that they have land plots and undertake to cultivate them in order to grow basic products. In rural areas, the tendency toward self-sufficiency can be expanded by breeding poultry and animals, including cattle. It has been analyzed that before the war, wheat, sunflower, and corn accounted for the majority of the harvest since a significant part of it was intended for export. The blocking of ports has shown the disadvantages of exporting large volumes of these crops. Consequently, there is a growing demand for niche high-margin crops (peas, berries, mustard, etc.), the transportation of which is more variable. Thus, there are reasons to believe that such trends will continue in the coming years; however, this will not harm the cultivation of wheat, sunflower and corn as the major crops. It has been indicated that the primary task of the Ukrainian agricultural sector in the conditions of hostilities has become the reliable provision of the population with agricultural products and food. As a result, farmers and private agricultural households have demonstrated their key role in preserving and developing local markets and food supply chains. Thus, the conclusion of the classical agroeconomic theory was demonstrated in practice: the major pillar of the sustainability of small-scale agriculture is not its economic benefits over large-scale agriculture but the important fact that large-scale agriculture is conducted as a capitalist enterprise for the sake of profit and rent, while small-scale agriculture is conducted to ensure the existence of the producer himself. A peasant farmer will not stop farming even if it gives him nothing but an average salary. Therefore, small-scale agriculture can exist and develop with much less income than large-scale capitalist agriculture.

Key words: Crisis management, war, reconstruction, market economy, agriculture

1 Introduction

Agriculture is the cornerstone of the Ukrainian economy. Concessional lending and the production of value-added products are the pillars of sustainable development of the agricultural sector. Risk diversification and planned development of the industry are extremely significant in the conditions of war. The present academic paper discusses the prospects for the development of Ukrainian agriculture and assesses its current state. Ukrainian agriculture is characterized by a deformed agricultural structure that includes:

- an individual sector focused on traditional goods and the domestic consumer market, ensuring domestic food security;
- the corporate sector, which includes agroholdings and large agricultural enterprises with a significant share of foreign capital, focused on the constant expansion of monocultivation and exports.

Agricultural holdings lobby their interests on such a large scale that, despite their high incomes from business activities, they also monopolize state support for the entire agricultural sector (before the war, 5-10% of the largest agricultural enterprises took 70-80% of the national funds for agricultural support measures). At the same time, the income of agricultural holdings is taxed based on a simplified system. Their profits are being used on a large scale through tax havens (including Cyprus and the British Virgin Islands), which undermines local development and public goods in Ukraine. In addition, these entities receive significant investment resources from such institutions as the World Bank, the International Monetary Fund, and the European Bank for Reconstruction and Development. All the outlined aspects of the functioning of agriholdings lead to unfair competition with other actors in the agri-food market of Ukraine. They exert physical and economic pressure on individual and family farms, limiting their access to production factors (agricultural land, means of production) and sales, as well as reducing their income (by reducing purchase prices, and inflating prices for production inputs). It is extremely difficult to develop family farming in such conditions. It may become impossible in the long-term perspective (given the control of agroholdings over agricultural land and production chains).

The pre-war successes of Ukrainian agriculture (especially its corporate segment) in terms of technical progress, productivity growth, production and exports were unfortunately accompanied by significant social and environmental losses within the country. The aggression of Russia has revealed additional negative consequences of the agroholding model of Ukrainian agriculture. The war has made the functioning of large-scale agricultural production extremely difficult due to the breakdown of logistics chains, environmental disasters at corporate livestock farms, blocked markets, etc.

In the conditions of hostilities, the primary task of the Ukrainian agricultural sector was to ensure a reliable supply of agricultural products and food to the population. In this case, farmers and private households have demonstrated their crucial role in preserving and developing local markets and food supply chains. Therefore, the conclusion of the classical agroeconomic theory was demonstrated in practice: the major pillar of the sustainability of small-scale agriculture is not its economic benefits over large-scale agriculture but the important fact that large-scale agriculture is conducted as a capitalist enterprise for the sake of profit and rent, while small-scale agriculture is conducted to ensure the existence of the producer himself. A peasant farmer will not stop farming even if it gives him nothing but an average salary. This is precisely why small-scale agriculture can exist and develop with much less income than large-scale capitalist agriculture.

Currently, Ukrainian agriculture is facing a choice between two possible scenarios for further development. According to the first one, Ukraine restores the prewar structure of agriculture within the framework of postwar reconstruction and continues its policy towards the agricultural sector with further excessive support for agricultural holdings. However, such a scenario would be clearly unfavorable for the state and society.

The second scenario envisages changing agricultural policy to a sustainable one based on ensuring equal development rights for all groups of stakeholders involved in agricultural production, including transparent and fair access to agricultural and other land, production resources, free access to markets and competition on a fair basis. The result of these approaches will be a change in the agricultural structure that will enable family households to use their production potential for creating public goods and local development. Moreover, it will help ensure the adaptation of Ukraine’s agricultural structure to the EU. Such a scenario for the revival of agriculture and rural areas in Ukraine requires establishing a new institutional system to support domestic food security, implementing a European-oriented agricultural policy, responsible strategic planning and monitoring of the situation in the sector, and collecting relevant data. Ukraine should implement solutions, in particular, to manage agricultural and rural development according to the Polish (as well as the EU) model, including the establishment of state institutions providing small and medium-sized businesses with access to production resources and sales, and the creation of agricultural chambers bringing together both farmers and individual farmers. This will strengthen social control over the allocation of public funds to support agriculture and ensure fair competition for land and agri-food markets. In addition, it is necessary to change legislation in the areas of land relations (land market), agricultural taxation and social security in accordance with European values. Poland should support Ukraine in developing systems of registration and reporting of agricultural producers and monitoring of rural development, as well as in forming models of cooperation between agricultural organizations and farmers, etc.

The purpose of the academic paper was implemented in analyzing the development of agriculture in the conditions of war.

2 Literature Review

The issue of agricultural development in the conditions of war has been explored in the following studies: Trofimtseva O. (2022), Sievidova I. O. (2017), Savchuk V. K., (1995), Sabluk P. T., (2006), Sabluk, (2001), D. Dibrova, (2016), Rohach S. M., (2017), Rassadnikova S. I., (2013), Radchenko V. (2002), Peterson, E. (2022), Glauben, T., Svanidze, M., Götz, L. J., Prehn, S., Jaghdani, T. J., Djuric, I., & Kuhn, L. (2022), Ghosh, N., & Bhowmick, S. (2022), Fiott, D. (2022), Celi, G., Guarascio, D., Reljic, J., Simonazzi, A., & Zezza, F. (2022), Câmpeanu, V. (2022), Banse, M. (2022). Ukrainian authors also considered regional aspects of economic modernization, using qualitative data from European Union countries (Ladonko, L., Mozhaikina, N., Buryk, Z., Ostrovskyi, I., & Saienko, V. (2022).

3 Method

The following general scientific methods were used in the research: comparative, comparative, analytical, historical, etc.

4 Result and Discussion

Agriculture is the engine of the Ukrainian economy. In recent years, agricultural products have made up over 40% of all exports. In 2021, Ukraine exported 61,5 million tons of grains and oilseeds in the amount of 22.2 billion USD.

Global economic chains are structured in such a way that a large number of processing enterprises in the world and in individual countries are dependent on the Ukrainian agricultural industry. Transportation of grown products is one of the most crucial economic factors. The primary way to export grain is by sea: about 90% of grain was exported by sea and only 10% by land.
The current situation due to the war has significantly damaged logistics routes, and the blocking of ports has led to grain shortages and increasing prices on the world market. However, the situation in Ukraine is fundamentally different: a surplus of grain that cannot be sold on the domestic market due to the lack of demand has led to a decrease in prices. For comparison, world prices for wheat are 350-370 USD per ton, while in Ukraine they are only 180-200 USD per ton.

Currently, selling the grown products is the number one problem for agrarians since grain deteriorates over time, and the volumes of last year's crops stored in warehouses make it difficult to store the new yield due to lack of free space. The new sowing campaign, which will provide for next year's harvest, is now on the verge of failure. The major reason is that money is required to cultivate the soil, purchase seeds, fertilizers, protective equipment, fuel and lubricants, payment of taxes and salaries. Due to the lack of demand for the products and insufficient crediting, there is a severe shortage of them.

Government has announced about the first ships to leave Ukrainian ports. However, to what extent will this settle the situation on the market? The complexity of the situation lies in the fact that the grain purchased by foreign companies before the outbreak of the war will be sold in the first instance. Currently, more than 80 vessels are waiting to be loaded with grain, and hundreds of elevators and grain terminals are storing non-Ukrainian grain in Ukraine. The Ukrainian Sea Ports Authority reports that 480 000 tons of grain, oil and corn have been loaded in the cargo holds of vessels in the waters of "Pivdennyi", "Odesa" and "Chornomorsk" ports, and another 1 million tons of grain is stored in terminals and warehouses at the ports.

In July, exports of grain reached 2,7 million tons per month from Danube ports. However, this is only 30% of the monthly requirement and monthly demand for agricultural exports [3]. In total, about 20 million tons of grains intended for export were blocked in Ukraine. The President of Ukraine Volodymyr Zelenskyi said this figure could increase to 75 million tons after this year's yield [4]. Such difficulties with exports will certainly slow down economic processes in our country. One should also take into account the lack of foreign exchange revenues from selling agricultural products.

It is necessary to search for options for selling the agricultural products. One of them is the creation of new agricultural processing enterprises that will operate in Ukraine and focus on exports. This means processing grain into finished products such as flour, pasta, cereals, alcohol, animal fodder, starch, and other products.

The construction of enterprises producing alternative renewable energy sources such as biogas, bioethanol, and biodiesel will make it possible to supply the domestic market with energy and reduce dependence on imports. For instance, currently, most of the Ukrainian rapeseed imported by the EU is used for biodiesel production. Why shouldn't Ukraine sell ready-made biodiesel? The government should initiate such projects and create the conditions for developing these industries, and ensure proper conditions for business crediting. These measures will help resolve the issue of surplus products, manufacture products with higher added value, create new jobs and provide jobs for related industries.

The situation is extremely tense and requires immediate steps to resolve the situation. We are convinced that we should reorient towards processing agricultural products, taking into account the long-term consequences.

The domestic agro-industrial complex will reconsider the specialization of crop production; agricultural holdings will continue to disappear, and donors will help primarily small enterprises.

Despite the large-scale destruction of agricultural infrastructure, mining of our fields and a decline in production, leading experts claim that this major industry is unlikely to lose its status as the breadbasket of Europe and the world.

According to preliminary scientists' estimates, the potential direct damage to the domestic agricultural infrastructure and its assets as a result of Russia's full-scale aggression against Ukraine exceeds 6 billion USD.

Additional economic losses in the industry due to the war in 2022 are expected to be around 22 billion USD, and the decline in revenues from agriculture and related sectors is expected to be between 10 and 30%. According to the results of 2021, the share of the agricultural sector amounted to 10,6% of the national GDP. However, the assessment of the hostilities' consequences for the agricultural sector is complicated by the lack of analogies when a country with such a large and important agricultural sector for the world market as Ukraine would be involved in a war.

The UN experts believe that the most approximate situation is in Syria. In 2011, the agricultural GDP of this country was close to 49 billion dollars, that is, 20% of the total GDP. However, the comparison of Ukraine and Syria is not entirely correct, as this country has a much lower volume of exports of agricultural products.

The Center for Food and Land Use Research at the KSE Institute, together with the Ministry of Agrarian Policy and Food, in its analysis "Overview of Indirect Losses from the War in Ukrainian Agriculture", estimates that this figure in agriculture due to decreased production, port blockades, and higher prices for inputs is 23,3 billion USD.

After three months of full-scale war, losses in Ukraine's agricultural sector have already reached 4,3 billion USD, which is almost 15% of the country's capital. Most losses are recorded due to destruction or damage to agricultural land and lack of yield. Currently, it is impossible to clearly determine the amount of losses in the agricultural sector as a result of the hostilities because they keep happening. However, indirect losses in agriculture are expected to amount to about 23,3 billion USD.

International donors strive to ensure the so-called win-win effect – a form of cooperation where both parties are satisfied with the work. They involve suppliers of material resources in their programs, supporting both sides.

The target audience of international donor organizations is rural households and farmers, which are rightfully considered a factor in the fight against unemployment and a prerequisite for inclusive economic growth in rural areas. The small-scale farming sector is crucial for local employment and is the primary supplier of food at the local level.

In April 2022, the Ukrainian government sent comprehensive information to the EU on the needs of the agricultural sector for recovery. The European Commission should coordinate the expected assistance.

The most predictable expenditures by international donors are funding for demining programs. According to the Ukrainian Association of Deminers, about 83 000 square kilometers are currently mined with various types of explosives. For instance, according to the Food and Agriculture Organization of the United Nations (FAO), the cost of demining in Croatia was about 1,25 EUR per square kilometer, and the cost of destroying one stockpiled anti-personnel mine was 0,56 EUR. Oleksandr Nechyporenko informs, "Taking into account these expenditures, the cost of demining measures in Ukraine only in the specified area exceeds 10 billion USD".

It should be noted that a large part of the international assistance was provided by the European Union. For instance, since September 1, the State Agrarian Register has started accepting applications under a new program of assistance to small agricultural producers for a total amount of over 1,5 billion UAH, funded by EU budget support.

The non-refundable assistance is granted to farmers cultivating from one to 120 hectares of agricultural land or keeping from three to one hundred cows. However, both land plots and cows must be registered, since this is a key condition for receiving assistance. Private farms can also obtain this assistance.

FAO also plays an essential role. It has developed a rapid response plan since the outbreak of the war. It is currently calling to allocate 115,4 million USD to support nearly one million rural residents by providing agricultural assistance and food security to those most affected by the war. As part of this program, FAO has already provided assistance to 80 000 people in 13 regions of Ukraine. The organization continues to provide multi-purpose cash assistance to cover the basic needs of more than 5 000 families in the most affected regions of eastern and southern Ukraine.

Some experts believe that the tendency for large agricultural holdings and other companies to stagnate has intensified and the role of farms has increased since the outbreak of the war. What will the map of agricultural enterprises look like after the program is over (will large companies disappear, will the role of farmers and other small participants increase, etc.)?

The stagnation of agricultural holdings began long before the military conflict. According to the Institute of Agrarian Economics, only two companies in the group of these associations have been actively growing economically over the past few years – AST and "Epicenter Agro". While most of them were moving towards optimization, that is, reducing their land banks. The war has only accelerated this process.

An interesting fact is that agricultural holdings in Ukraine controlled less than 15% of agricultural land, that is, about 6,5 million hectares before the military aggression. And they often had mediocre performance indicators. This is evidenced by the financial statements of companies that are used to assess their profitability and are under the control of regulators.

The fact that the programs already being implemented in Ukraine by FAO and other donors provide for the maximum size of the recipients' land bank at 250-1000 hectares is also not conducive to the development of agroholdings in Ukraine.

Therefore, small agricultural holdings, which make up the majority of the total number, have no prospect of receiving international donor assistance for recovery. Consequently, without financial support, agricultural holdings' activities, which were already weak before the outbreak of war, will rapidly deteriorate.

How are the focus and specialization of agricultural enterprises currently changing? For instance, do farms stop growing particular crops and start growing other crops, or do they change their livestock specialization, etc.?

5 Conclusion

Thus, according to the forecasts of the Institute of Agrarian Economics, this year's production of grains and legumes may decrease by up to 30% compared to 2021. Wheat production is likely to decrease by 34%, barley by 45%, and corn by 2%, respectively. However, this will not affect the satisfaction of domestic demand for grain and legume products. By the way, buckwheat production through reseeding and changing the structure of crops will make it possible to fully meet the population's needs and get some residuals. As for industrial and other crops, production is expected to decline by up to 30%, and sunflower – by up to 34%. The practice of vegetable gardening, popular in the 1990s, becomes relevant again. More and more citizens mention that they have land plots and undertake to cultivate them in order to grow basic products. In rural areas, the tendency toward self-sufficiency can be expanded by breeding poultry and animals, including cattle. Before the outbreak of the war, wheat, sunflower, and corn accounted for most of the yield since much of it was intended for export. The blocking of ports has shown the disadvantages of exporting large volumes of these goods. Consequently, there is a growing demand for niche high-margin crops (peas, berries, mustard, etc.), the transportation of which is more variable. Thus, there are reasons to believe that such tendencies will also develop in the coming years, but this will not harm the cultivation of wheat, sunflower and corn as the major crops.

Literature:

1. Banse, M. (2022). Der Ukraine-Krieg und seine Folgen: Auswirkungen auf die agrarpolitische Debatte Informations. https://www.thuenen.de/media/ti/Infothek/Vortragsfolien_30_03_2022_Ukraine_Krieg_und_seine_Folgen.pd.f
2. Câmpeanu, V. (2022). The Effects Of The War In Ukraine – The Global Food Crisis Becomes More Real. *Euroinfo*, 6(1), 3–15.
3. Celi, G., Guarascio, D., Reljic, J., Simonazzi, A., & Zezza, F. (2022). The Asymmetric Impact of War: Resilience, Vulnerability and Implications for EU Policy. Intereconomics, 57(3), 141–147.
4. Fiott, D. (2022). The Fog of War: Russia's War on Ukraine, *European Defence Spending and Military Capabilities. Intereconomics*, 57(3), 152–156.
5. Food and Agriculture Organization of the United Nations. URL: https://www.fao.org.

6. Ghosh, N., & Bhowmick, S. (2022). Why India's food value-chain needs better risk management instruments amid Ukraine war.
7. Glauben, T., Svanidze, M., Götz, L. J., Prehn, S., Jaghdani, T. J., Djuric, I., & Kuhn, L. (2022). The war in Ukraine exposes supply tensions on global agricultural markets: Openness to global trade is needed to cope with the crisis (No. 44e). IAMO Policy Brief. https://www.nas.gov.ua/UA/Messages/Pages/View.aspx?MessageID=9288
8. KSE Agrocenter (2022). Indirect losses in agriculture are estimated at 23,3 billion USD. https://ukranews.com/en/news/864573-indirect-agriculture-losses-from-war-estimated-at-usd-23-3-billion-agrarian-ministry.
9. KSE Agrocenter (2022). The total losses from the war in Ukraine's agriculture reached $ 4.3 billion USA. https://kse.ua/ua/about-the-school/news/zagalni-zbitki-vid-viyni-v-silskomu-gospodarstvi-ukrayini-syagnuli-4-3-mlrd-dol-ssha-kse-agrotsentr.
10. Ladonko, L., Mozhaikina, N., Buryk, Z., Ostrovskyi, I., & Saienko, V. (2022). Regional aspects of the economy modernization: the qualitative evidence from EU countries. *International Journal for Quality Research*, 16(3), 851-862.
11. Official Website of the International Trade Administration. Ukraine – Country Commercial Guide. URL: https://www.trade.gov/country-commercial-guides/ukraine-agricultural-machinery.
12. Oxford Analytics. Russian war aims and grain plans to fuel global crisis. Emerald Expert Briefings, (oxan-db).
13. Peterson, E. (2022). The Coming Global Food Crisis. Cornhusker Economics, June 8
14. State Statistics Service of Ukraine. https://ukrstat.gov.ua.
15. The Law of Ukraine On Amendments to Section XXI "Final and Transitional Provisions" of the Customs Code of Ukraine regarding the exemption from import duty of goods used for storage of grain and/or oilseeds 2445-IX as of 27.07.2022. https://zakon.rada.gov.ua/laws/show/2445-20#
16. CMU Government Portal. 2022 - Sowing campaign has been completed in Ukraine. https://www.kmu.gov.ua/news/v-ukrayini-zavershena-posivna-kampaniya-2022.
17. CMU Government portal. Ukraine's recovery plan: education and science as the cornerstone of human development. URL: https://www.kmu.gov.ua/news/plan-vidnovlennia-ukrainy-osvita-ta-nauka-iak-fundament-rozvytku-liudskoho-potentsial
18. Nesterov O. War, agriculture, VAT: what's new in the field of taxation? https://www.ucab.ua/ua/pres_sluzhba/blog/oleg_nesterov/viyna_agro_pdv_scho_novogo_v_sferi_opodatkuvannya.
19. Resolution On Approval of the Procedure for Departmental Registration and Deregistration of Tractors, Self-Propelled Chassis, Self-Propelled Agricultural, Road Construction and Reclamation Machines, Agricultural Machinery, and Other Mechanisms as of July 8, 2009. N 694. https://zakon.rada.gov.ua/laws/show/694-2009-%D0%BF#Text
20. Radchenko V., Liutyi Yu. Organization and efficiency of various forms of agrarian business. The USA and Canada.– 2000.–No 3. – p.104.
21. Rassadnikova S.I. Methodological principles and directions of ecological infrastructure development in solving the problems of noospheric development / S.I. Rassadnikova. Transactions of Taurida National University (TNU) named after V. I. Vernadsky - 2013 - Vol. 26 (65): Geography. – P. 200-210.
22. Rohach S.M. Economics of enterprises (in diagrams and tables). Study guide / S.M. Rohach, N.M. Sulima, T.A. Hutsul – Kyiv: Komprint Publishing House., 2017. – 510 p.
23. Development of the mechanism of wheat market regulation in Ukraine / A.D. Dibrova, L.V. Dibrova, Ya.O. Krylov, M.A. Dibrova // Scientific Bulletin of NULES of Ukraine. Series: *Economics, agrarian management, business*. – 2016. No. 244. – P. 210–222.
24. Development of diversity in rural areas: features, problems Edited by Academician of the Ukrainian Academy of Sciences V.V. Yurchyshyn - Kyiv: SSC IAE, 2004. 446 p.
25. Sabluk P.T. New economic paradigm of forming the strategy of national food security of Ukraine in the XXI century – K.: IAE UAAN. 2001. – 94 p.
26. Sabluk P.T. Development of land relations in Ukraine. - K.: SSC IAE, 2006. - 396 p.
27. Savchuk V.K. Analysis of economic activity of agricultural enterprises, 1995. – 328p.
28. Sievidova I.O. (2017). State, problems and prospects of vegetable growing in Ukraine Investments: practice and experience. No. 12. - P. 28-33. http://www.investplan.com.ua/pdf/12_2017/7.pdf
29. Agriculture during the war: changing priorities. Government courier. URL: https://ukurier.gov.ua/uk/articles/silske-gospodarstvo-pid-chas-vijni-zmina-prioritet/
30. Trofimtseva O. (2022). The war showed the importance of the agricultural sector. How to take new heights? https://interfax.com.ua/news/blog/839762.htm.

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