

Review Paper

Analysis of the Impact of the War on the Economic State of Agriculture in Ukraine

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ABSTRACT

The purpose of the study is to determine the impact of the war in Ukraine on the state of agriculture and the economy of the country in general. The general scientific and special methods were used to achieve the goal: synchronous and diachronic, logical, analysis and synthesis, dialectical, scientific abstraction, and comparative analysis. As a result, it was identified that the economy of Ukraine largely depends on agricultural production, but because of the war, the agricultural sector suffers huge losses. The indicators of total exports of Ukraine have almost halved in comparison with the pre-war period, agricultural land and uncollected crop become half of the entire structure of damage in agriculture, and due to constant hostilities, it is impossible to purchase feed and provide veterinary services to farm animals, as a result of which they die. In addition, the difficult economic state of agricultural production is also associated with a decrease in agricultural productivity, violation of crop cultivation technologies, recoupage of territories, lack of funds and human resources, and constant military operations, as a result of which the agricultural infrastructure has experienced unprecedented destruction. These reasons affect the internal and foreign markets, which is of great importance in ensuring world food security.

HIGHLIGHTS

- Russia's war against Ukraine has led to enormous losses in the economy of Ukraine in general and in the field of agriculture in particular. The examination of the costs as a result of hostilities and the current economic situation in Ukraine determines the relevance of the study.

Keywords: Agricultural sector, losses, martial law, production, export

Agriculture in any process of economic development of the state is an important element of regulating food security, which provides the population and guarantees food independence (Claudia *et al.* 2022). M.V. Negrey and O.V. Trofimtseva (2022) claim that Russian aggression against Ukraine creates a high risk of a shortage of supply in the food market. The war also created a huge and worsening problem of food security in the world and caused disruptions in agricultural production. In addition, given that the war has substantially undermined livelihoods during the agricultural growing season due to restrictions on physical access and damage to homes, businesses, farms, production assets,

agricultural land, roads, and other infrastructure, today it is an urgent issue to assess the real state of the agricultural sector.

According to E. Savitsky (2022), the question of whether Ukraine will be able to plant new crops, support animal husbandry, and harvest crops as the military situation develops remains relevant. In addition, the war led to the suspension of oilseed processing operations, and the introduction of

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export licensing restrictions and bans on certain crops and food products. With insecurity and disruption of both local and national food supply chains, crisis levels of hunger and malnutrition are likely to worsen further, which also supports the importance of conducting such studies.

Researchers V.P. Onishchenko (2023), T. Yu. Melnyk (2022), A.V. Gumenyuk and O.V. Garmatyuk (2022), N. Saray (2022) agree that the concern is not only the risk of reducing the availability of grain from the countries of the Black Sea basin but also the level of production in the next harvest season. The limited availability of resources for production in Ukraine (fertilisers, fuel) may negatively affect the strained balance of grain and petroleum products in the world. In addition, restrictions on the trade in fertilisers from Russia will force the problem of the availability of fertilisers to affect other areas of production.

Consequently, the field of agriculture plays a substantial role in the economy of the country and ensuring a stable source of food since it determines not only internal economic growth but also political and social (Aaditya *et al.* 2020). Due to the unprecedented scale of losses caused by the Russian invasion, it is important to examine the volume of losses inflicted on agriculture and the economy of Ukraine in general, this determines the relevance of the study.

In this regard, the purpose of the study is to analyse and assess the impact of military operations in Ukraine on the economic condition of the agricultural sector of the country. The main objectives of the paper: analyse the export indicators of Ukraine, the structure of damage to the agricultural sector by category, and the state of the economy in general.

MATERIALS AND METHODS

Information base of the study: official Internet resources of the Ministry of Agrarian Policy and Food of Ukraine (2023), Ministry of Environmental Protection and Natural Resources of Ukraine (2023), Cabinet of Ministers Ukraine (2023). Information data from the World Bank (2023), statistical materials of the Food and Agriculture Organisation of the United Nations (FAO) (2023), and monographic and periodical scientific literature.

The theoretical basis of the study was the main provisions and results of the research conducted by researchers concerning the problems and consequences of Russia's war against Ukraine.

The investigated materials were analysed using comparison, grouping, and abstract-logical method, which was aimed at examining the role of agriculture in the economy of the country before and during the war. The methodology is based on the theoretical provisions of papers of researchers on the relationship of agricultural production, export of products, and food consumption on economic indicators, and a systematic multifactorial analysis of the situation in the agricultural sector during martial law.

The following groups of methods were used to achieve these goals: dialectical, general scientific, and special methods. When assessing the state of the agricultural sector under the influence of military operations, statistical analysis was used: the method of averages and relative values, trend analysis, index method, coefficient analysis, and comparative analysis to compare the results obtained over different years. The logical method of the approach to the examination of the state of the agricultural industry of Ukraine was also used.

In addition, the method of economic and statistical research based on input data and ratios was used to analyse economic indicators. A retrospective method was used to direct from the effect to the cause, which allows correcting knowledge about the general nature of the development of events.

A set of special and general scientific groups of methods was used in the research process, namely: dialectical (to clarify the patterns of the impact of war on agriculture), visual (to visualise the results of the study), grouping (to examine the totality of data), analysis (when formulating the goals, objectives of the study, and to analyse the collected information, compilation of results), abstraction (to determine the subject of research), statistical methods (to express data), synthesis (to combine the knowledge gained into a single whole), scientific abstraction (in determining the essence of war and the importance of the agricultural sector in the economic field), and comparative analysis (to compare the results).

Synchronous and diachronic methods were also applied, which were used to describe and analyse the impact of military actions on the agricultural sector and the economic state of Ukraine.

In addition, to determine issues related to the current state of agriculture in Ukraine during the war and economic indicators, the following indicators were analysed during the study: total exports of Ukraine and exports of cereals, legumes, and flour, the structure of damage to the agricultural sector by category, and loss in the livestock sector through a decrease in production volumes.

RESULTS

The agricultural sector of Ukraine has a substantial position not only in the economy of the country but also in the global economy while occupying its niche in ensuring world food security. So, in 2020, according to FAO (2023), the export potential of Ukraine was estimated at about 49 billion US dollars, and in 2021 – 68 billion US dollars. In addition, the share of agri-food products in total exports was then more than 40% annually.

The Russian invasion of Ukraine was a turning point for the whole world and threatened security, the international economy, and the global energy architecture. In a globalised world, war cannot be localised in one region, since the consequences of Russia's armed attack on Ukraine will be felt in many countries covered by food supply chains.

Thus, the year 2022, which began with the Russian invasion, was characterised by completely different export indicators compared to the pre-war period. According to numerous data of researchers, a full-scale war of the Russian Federation against Ukraine will lead to the fact that Ukrainian economy may shrink by 45% (Negrey and Trofimtseva, 2022, Onishchenko, 2023). In addition, according to the calculations of the Ministry of Agrarian Policy and Food of Ukraine (2023), direct and indirect losses in agriculture total more than 40 billion US dollars. Problems with the export of products from Ukraine related to the blockade of ports have led to the fact that Ukrainian producers have to either focus on the internal market or look for ways to export while storing their goods longer and increasing financial losses. Therewith, the naval blockade led to an increase in shipping prices, as exporters

were forced to rebuild logistics chains by rail, river ports, and trucks, and a reduction in demand for export-oriented crops due to physical restrictions on export channels.

In addition, the indicators of Ukraine's total exports in 2022, compared with 2021, have almost halved, this, in turn, affects the economic component of production, leads to losses of enterprises and farmers, creates a problem of lack of current assets for a new sowing campaign (Ministry of Agrarian Policy..., 2023).

Even if the export routes could be unblocked, the situation would not improve quickly, since the Government of Ukraine on March 9, 2022, to ensure sufficient food, informed about the introduction of a ban on the export of rye, barley, buckwheat, millet, sugar, salt, and meat (Cabinet of Ministers Ukraine, 2023).

In foreign markets, cereals, legumes, and oilseeds are the most demanded products of the agricultural sector of Ukraine. According to the Ministry of Agrarian Policy and Food (2023), in 2022, compared with 2021, exports of cereals and legumes from the country decreased by more than 30%, and wheat flour – by 25% (Table 1).

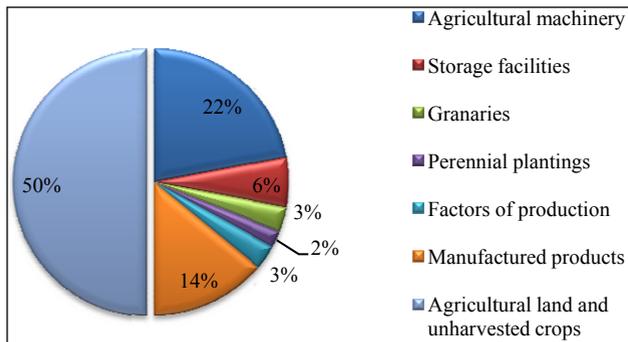
Table 1: Export of cereals, legumes and flour from Ukraine, thousand tonnes

	2022/2023		2021/2022	
	Total	in Feb. 2023	Total	in Feb. 2022
Cereals and legumes, total	27456	480	39120	647
Wheat	9843	107	17200	146
Barley	1827	9	5483	1
Rye	12.8	0	156.8	0.3
Corn	15680	362	16015	497
Wheat flour, thousand tonnes	81.2	1.9	62.8	0.2
Other flour, thousand tonnes	3.8	0	1.1	0
Export total (grain and flour)	27570	483	39205	647

Source: Ministry of Agrarian Policy and Food of Ukraine (2023).

In addition to the fact that export opportunities are limited, it is also important to consider the degree of destruction caused by Russia, namely those related to the agro-industrial complex. Thus, agricultural land and non-harvested crops occupy the largest

percentage and become half of the entire damage structure, and according to FAO data (2023), the amount of damage in this category is estimated at 2.135 million dollars (Fig. 1).



Source: Ministry of Agrarian Policy and Food of Ukraine (2023).

Fig. 1: Structure of agricultural sector damages by category

The negative consequences of the war also include the fact that Russia purposefully destroys elevator facilities to weaken the Ukrainian agro sector. According to the Ministry of Agrarian Policy and Food, farm animals are dying from active hostilities, limited access to farms and opportunities for the purchase of feed and the provision of veterinary services. The largest percentage of losses in the field of animal husbandry due to reduced production volumes in the aftermath of the war is pig farming – 39%, egg production – 28%, and cattle breeding – 10%.

Subsequently, agricultural lands in Ukraine were subjected to two types of damage – direct physical damage and my contamination. Damage to the fertile soil layer was caused by craters from rocket attacks, artillery shells, and military equipment. With regard to mine pollution, in addition to minefields, places contaminated with unexploded ordnance pose a deadly threat to farmers during fieldwork. In addition, according to the Ministry of Environmental Protection and Natural Resources of Ukraine, mine explosions pollute the soil with heavy metals such as lead, cadmium, nickel, strontium, titanium, as a result of which the soil becomes unsuitable for further agricultural use (Ministry of Environmental Protection and Natural Resources of Ukraine, 2023).

Rising energy costs and supply disruptions have led to the fact that prices have risen for important elements of crop cultivation technology, including mineral fertilisers, plant protection products,

and fuel, which in turn affects the profitability of production. According to the Ministry of Agrarian Policy and Food, even after the reduction of acreage, the increase in fertiliser costs leads to losses in the amount of 377.1 million US dollars, and the increase in fuel costs – 485.1 million US dollars of losses for agricultural producers (Ministry of Agrarian Policy and Food, 2023).

A big problem for Ukraine is also huge emigration and internal migration, which affect the efficiency of the economy. The evacuation of a large number of people inside the country, mainly from combat areas or adjacent territories, and the associated relocation of many companies, substantially affect production volumes in all industries.

In the future, the participants of the Ukrainian agricultural market will be able to realise not only their huge production but also their economic potential and ensure further growth and integration into the international economic system. Due to its wealth of resources, Ukraine plays an important role in the world supply of agricultural and food products and has good prospects for development. So, it is quite possible that Ukraine will become one of the leading exporters of agricultural products in the world.

Thus, the Russian invasion of Ukraine has dealt a blow to a key sector of the economy of the country – agriculture, resulting in increased uncertainty about access to selected foods and social impoverishment. The problems associated with the export of agricultural products have led to an increased threat to global food security, and uncertainty will remain as long as the fighting continues.

Consequently, the military actions of the Russian Federation on the territory of Ukraine affected the creation of new conditions for the functioning of the economy of the whole country and the agricultural production sector in particular. The challenges facing the agricultural sector require rapid adaptation to new conditions, a transformation of activities, and new approaches to solving the way out of the current situation, which is the prospect of further research.

DISCUSSION

Guaranteeing food security is part of the national security of any country, which is due to the fact that

no state can ensure its national, including economic, security, without meeting the demand for food (Van Meijl *et al.* 2022).

According to V.P. Onyshchenko (2023), before the war, well-educated and capable people, a favourable climate, excellent soils, and a developed trade infrastructure contributed to the fact that Ukraine was one of the world's largest exporters of wheat, corn, barley, flour, the country also dominated the sunflower oil market and was one of the largest producers' steels, which is confirmed by the conducted study.

I. Yu. Pidorycheva and V.P. Antoniuk (2022) argue that since Ukraine is one of the main producers and exporters of agricultural products in the world, the war provoked by Russia can jeopardise the food security of many countries, especially those that depend on imports of food and fertilisers from Ukraine, which is also demonstrated by the results of the study.

According to P. Hellegers (2022), the war of the Russian Federation against Ukraine contributes to the growth of fears about a sharp global economic downturn, rising inflation and external debt, and an increase in poverty. The economic impact has consequences on many fronts, including on commodity and financial markets, trade and migration ties, and the agricultural sector.

This correlates with the scientific statement of V. Câmpeanu (2022), who notes that with the intensification of the war, pollutants from ammunition explosions can seriously affect the soil, water, and the atmospheric environment, which directly affects the growth of crops, their quality and quantity, and food production.

The results of the study find a response in the papers of D. Fiott (2022) and T. Glaubien *et al.* (2022), according to which, in a negative scenario, Ukraine may lose valuable agricultural, industrial, and mining lands, leading to a reduction in the economy. In addition, the losses of Ukraine are increasing every day of the Russian invasion, and in the conditions of the ongoing war, the restoration of the country may seem distant.

It is important to note that the results of O.J. De Groot's *et al.* (2022) study show that the acceleration of economic development in the first 2–4 years after the war can substantially reduce the costs

of the conflict – this is important not only from the standpoint of Ukraine, but also neighbouring countries, and in the long term will determine the future of the manufacturing sector, which is also established in the conducted study.

It is currently unknown when the war will end, what will be the scale of losses on the part of Ukraine, and the costs of reconstruction. In this situation, it is difficult to give recommendations or conclusions. However, evidently, the international community will have to assume substantial obligations in the restoration of the destroyed country, and the agricultural sector and the economy of Ukraine, in general, must adapt to the new existing realities.

CONCLUSION

In the course of the research, it was identified that the agriculture sector occupies a crucial role in the economy of Ukraine, which, due to the unprecedented scale of losses caused by the Russian invasion, is experiencing substantial damage. Due to Russia's war against Ukraine, all branches of agriculture have suffered: crop production, animal husbandry, seed production, feed production, and enterprises storing and processing agricultural products, etc. In addition, a substantial part of the arable land remains mined, the fertile soil layer is damaged, and the agricultural infrastructure is under systematic military operations. In addition, the challenge for agricultural production is the increase in prices for means of growing and harvesting plants, fertilisers, fuel, and animal feed, which in turn will affect food prices.

No country has experienced such devastation since the Second World War as Ukraine. The war reduces the income of the country and brings losses to the economy by reducing aggregate productivity, destroying physical and human capital. The war also hinders economic growth by limiting the share of internal and foreign trade.

The Russian invasion has dealt a substantial blow to the agricultural sector of Ukraine. According to the results of the study, the indicators of Ukraine's total exports in 2022, compared with 2021, decreased by almost half, which affects the profitability of production and leads to losses for enterprises, the indicators of exports of cereals and legumes decreased by more than 30%, and wheat flour – by

25%. The largest percentage of losses in the field of animal husbandry in the aftermath of the war is pig farming, which is 39%, egg production – 28%, and cattle breeding – 10%.

The war in Ukraine seriously affects the availability of food almost all over the world, since the result of Russian aggression against Ukraine is a threat to global food security, and the export corridor remains unreliable due to Russia's unstable behaviour.

The practical significance of the results obtained determines the prospect of further research, which should be based on the search for effective methods of restoring the agro-industrial sector.

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