

THE MODERN CHALLENGES FOR THE FOOD SAFETY OF UKRAINE**Dyudyayeva O.,***Senior Lecturer, Export Expert to the EU,
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Kherson, Ukraine*<https://doi.org/10.5281/zenodo.10378816>**Abstract**

From 20 to 30 percent of the population in developed countries is involved in agribusiness, thanks to which it remains one of the most budget-filling and profitable in the world.

Today, the agricultural sector is developing most strongly in the United States of America (up to 12 percent of GDP).

Since the European region cannot provide itself with agricultural products and raw materials in full, the agro-industrial complex is formed in such a way that global connections are taken into account.

Agribusiness in Ukraine has great potential for development, as it has the largest area of agricultural land in Europe (41.5 million hectares, or up to 70 percent of the total territory). About 25% of the world's chernozem soils with a high level of fertility are concentrated in Ukraine. The agricultural sector accounts for more than 10% of GDP and is one of the most important export sectors. The agro-industrial complex is constantly developing, which is explained by the proximity of the main sales markets, the existing infrastructure, including transport, and the constant growth of global demand for food products.

Given that Ukraine is one of the world's leading exporters of grain and oil crops, Russia's military invasion of our territory had a significant impact on agribusiness and food safety around the world.

Keywords: the food safety, modern challenges for the food safety.

Introduction

The modern stage of human development is accompanied by the emergence of qualitatively new types of danger. The sustainable development of world civilization depends on ensuring its security, in particular food safety. For people, the problem of food safety has always existed, since food with the environment, make up a complex of conditions for the sustenance of mankind.

Forming and satisfying primary food needs, a person develops his own abilities, human potential in social development. Thus, food safety is the most important condition for the sustainable existence and development of an individual, various social groups and society in general, a component of economic and, ultimately, national security of the state. An effective mechanism for ensuring food safety contributes to the optimization of the social climate in society. The quality and length of life, the state of health of the population, and the standard of living in general are largely determined by how complete the country's food supply is. The standard of living of the country's population in society depends on the level of development of industrial production, agriculture, the state of branches of the public sector of the economy, scientific and technical potential, but first of all - on the state of the domestic food market, the degree of dependence of its situation on the world food market, the solvency demand of the population, the social status of people, the possibility of consuming high-quality and complete food products. The food dependence of one or another country arises as a result of low-efficiency agriculture and the food

industry as a whole, as well as monocultural exports, self-isolation of the state in the field of food resources formation, falling economic growth rates, worsening of the foreign debt problem, instability of the national currency rate, etc. Without ensuring food safety, it is impossible to successfully solve economic and social tasks, to positively influence the ongoing world processes, to defend the state interests of the country. Solving the problem of ensuring food safety is a priority of state policy, an object of legislative activity and scientific research [1].

Materials and methods

The research was based on the learning of global reports and statistical data of the Food and Agriculture Organization of the United Nations, statistical data of the State Statistics Service of Ukraine, State Customs Service of Ukraine, national and regional reports.

Results and discussion

According to the statistical data of the State Statistics Service of Ukraine, in the pre-war period, a constant increase in the average grain yield was observed. For example, in 2019, the yield increased by 2.2 quintals per hectare compared to 2018 and amounted to 49.1 t/ha. There was a significant increase in the yield of the agricultural crops, such as winter wheat, barley, corn, and sunflower.

As of the end of 2019, revenues from the export of agricultural products to the country's budget amounted to almost 40% and demonstrated stability over the past three years (Fig. 1).

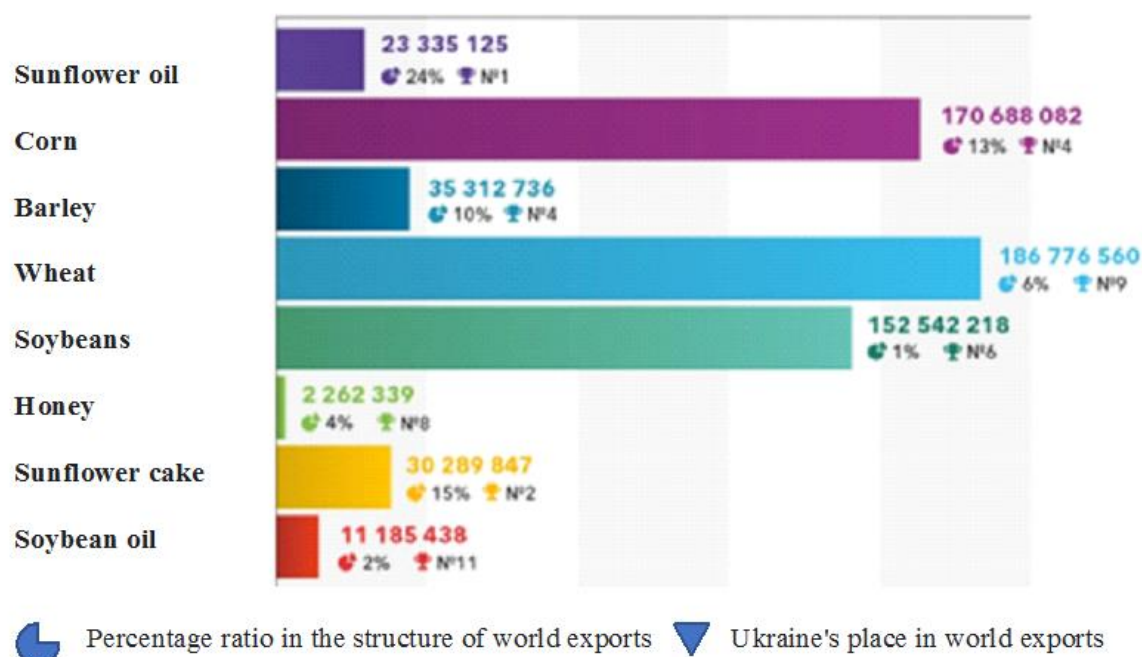


Fig. 1. Ukraine's place in world exports [2]

Ukraine is the world's largest exporter of sunflower oil and one of the largest exporters of crops, successfully competing on international markets with a number of agricultural crops. Crops are exported to China, Korea, Egypt, Israel, Iran, Tunisia, Turkey (Fig. 2) [2].

Ukraine remains one of the agricultural leaders in the world, producing up to 100 million tons of grain crops annually and is among the TOP-3 in terms of

grain exports in the world (grain exports up to 50-60 million tons annually).

Despite the difficult year 2020, the export of agricultural products remained the most stable in Ukraine [3]. The main products of export, as in previous years, remained grain crops, fats and oils of animal and vegetable origin, seeds and fruits of oil crops, residues and waste of the food industry (cake), etc. [4].

Although even before the pandemic, a slowdown in economic activity began to be observed.

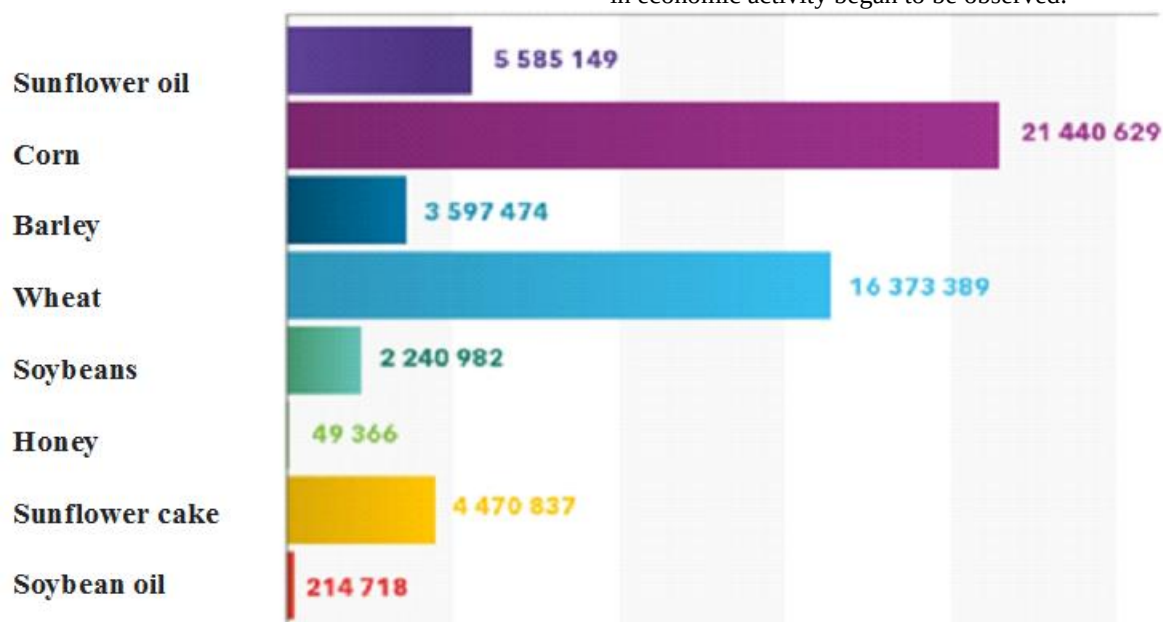


Fig. 2. Export of Ukraine in agribusiness (31.12.2020)

As a result of the pandemic and the introduced quarantine measures, according to the Ministry of Economic Development, Trade and Agriculture, the drop in Ukrainian GDP was 6.5% in the first half of 2020 [5].

Quarantine affected consumer sentiment, almost brought several industries to a standstill - retail trade, hotel and restaurant business, and air transportation. As a result of the quarantine, Ukrainian companies froze investments and production chains.

The food industry and the agro-industrial sector were affected. Moreover, some food companies faced a rapid increase in demand for their products as panic buying intensified across the country, and in some cases, competitors' imports were limited. Other industry sectors, such as domestic food producers, experienced a rapid decline in demand from the food industry, restaurant and cafe sectors. Agrarian Ukraine, where consumers and businesses have experience of both hyped sales of products and crises related to the lack of markets for the sale of food, survived the first month of quarantine without empty shelves in stores and fear of hunger. The increase in demand for food products caused an increase in retail prices for products by 1-4%, in return, business was forced to win back sales markets - both in Ukraine and abroad.

Grain producers were the first and most significantly affected, because they received export restrictions, which led to a reduction in sales abroad by 70%. In the fruit and vegetable business and animal husbandry, the closure of local bazaars within the country, where the majority of products were sold in the regions, caused the most trouble. The government introduced a ban on the export of some domestic products.

Other problems that arose during quarantine measures are restrictions on the movement of workers involved in agriculture and the food industry, excessive quality control of food products. This led to a delay in deliveries and left the population without the necessary products, causing a price increase of 5-6%.

At the same time, the Food and Agriculture Organization of the United Nations (FAO) has warned that the world will face the danger of a food crisis if it does not promote the creation of opportunities to grow and sell agricultural products.

The war started by Russia significantly affected the state of food safety in Ukraine - the country took the last place in the European rating (26th place out of 26) and on the global map took the 65th place among 113 countries of the world. This is caused by a significant increase in prices, a change in the average cost of food products, and the lack of powerful state protection programs [24].

According to the indicator "Availability of food products", Ukraine received 48.1 points out of 100 and ranks 93rd in the world. The weakest factors according to this methodology are political and social barriers, supply chain infrastructure, marketing research in the industry and implementation of a food access strategy [6].

The worst indicator of Ukrainian food safety is "Sustainability and adaptability" (43.5 points out of 100

and 94th place in the global rating). It demonstrates significant problems related to access and management of natural resources and deficiencies in the risk management system.

The only indicator showing a better situation is food quality and safety. Ukraine has 71.3 points out of 100 and ranks 52nd in the global ranking.

The destruction of logistics chains and infrastructure, destroyed farms and production, the reduction of production volumes at those enterprises that are working, the increase in basic food needs in the most affected regions of the country became the reasons for the deterioration of food safety in the country due to the war.

However, in 2022, Ukrainian exporters quickly learned to solve non-trivial problems. There was no choice - it became a condition of survival. The companies quickly recovered from the shock of the invasion and already in April began to restore volumes of deliveries abroad under radically new safety and logistical conditions. Since August, the Black Sea grain initiative has been operational, which made it possible to restore most of the exports. Due to the collapse of domestic demand, even companies that have always focused on the Ukrainian market began to look at foreign consumers [7].

According to the State Customs Service, the export of goods from Ukraine in 2022 decreased by 35% to \$44.2 billion. The reduction hit all industries. The only notable exception was the export of IT services, which grew by 6% to \$7.35 billion.

The agro-industrial and mining and metallurgical complexes, which provided more than $\frac{2}{3}$ of goods and more than half of total exports, became the leaders in terms of export volumes in the war year. The leaders in terms of export value among goods are grain crops, sunflower oil and ferrous metals. In the pre-war years, metal was the main export product of the country. According to the results of 2022, its exports more than tripled to \$4.5 billion.

The list of top 50 exporters includes companies with different strategies. Some found new markets and managed to increase the volume of exports, others, on the contrary, froze production at the beginning of the Russian invasion, then only sold off the remaining products.

The EU accounted for more than 63% of commodity exports. Among the rest of the countries, Turkey and China became the largest buyers of Ukrainian products. The TOP countries to which Ukraine exported in 2022 and how the war redirected Ukraine's grain exports are presented in Figure 3.

The total volume of exports in 2022 amounted to \$60.3 billion. Moreover, the largest share, 35% of the total volume of exports, was the products of the agro-industrial complex.

The main thing that Ukrainian companies have achieved in several of the most difficult years for the food market, for their own and international food safety, is that they have adapted to the circumstances of wartime and will continue to look for new ways to solve the problem in 2023.

As a result of hostilities, the sowing campaign of 2022 has become the most difficult since the beginning of Ukraine's independence. The occupation of territories and hostilities led to a decrease in cultivated areas by 3.5 million hectares, a shortage of labour, agricultural machinery, fuel, funds, and the destruction of logistics routes - these are big challenges for domestic farmers that they have not faced before [8].

Today, the agricultural sector of Ukraine works not only for the food safety of Ukrainians, but also for the support of other countries of the world. This statement was once again emphasized by the year 2022,

when the war unleashed by the Russian Federation destroyed part of the food chains and the importance of Ukraine in providing the world with food was realized by everyone. But the situation in the center of the country remains difficult - farmers are forced to work in conditions of constant risk to their lives, and the population, especially in the de-occupied regions and the frontline, often does not have access to a sufficient amount of food.

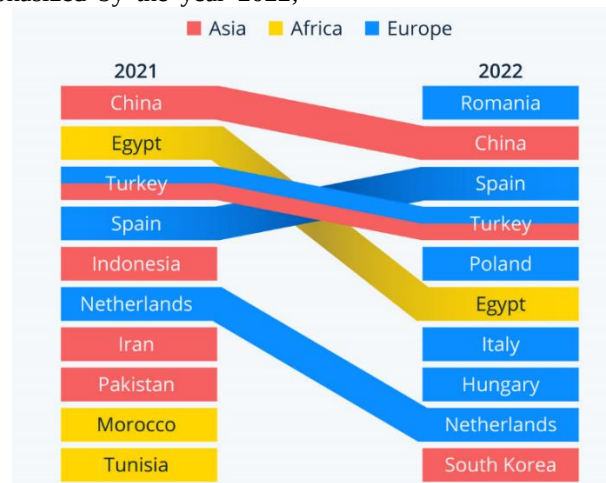


Fig. 3. TOP 10 countries of Ukraine cereal exports in 2021/2022 [9]

Given that Ukraine is one of the world's leading exporters of grain and oil crops, Russia's military invasion of our territory had a significant impact on agribusiness and food safety around the world.

As an example, in 2021 Ukraine exported almost 6 million tons of oil (47% of world sales). The begin-

ning of the war caused a significant decrease in the volume of supplies on the world oil market and an increase in the price.

The situation on the import market of Ukrainian products in 2022 was announced at the summit in Malta in 2023 (Fig. 4).

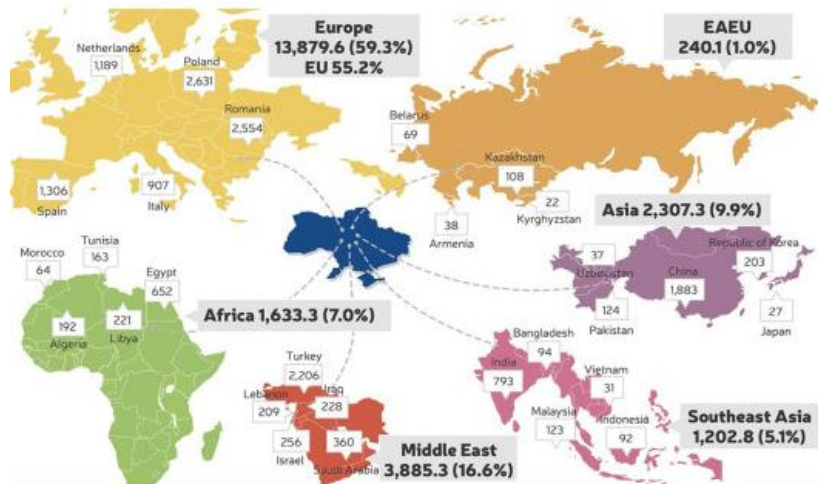


Fig. 4. Ukraine's place in global food safety (Imports of domestic products in 2022, million \$) [10]

From the point of view of economic evaluation, experts equate the military invasion of the Russian Federation on the territory of Ukraine with the financial crisis of 2009 and the COVID-19 pandemic. At one time, this led to an increase in the degree of uncertainty, which negatively affects consumption and investment, and has a negative impact on GDP (gross domestic product).

According to FAO research, the global food price index reached an all-time high in February 2022 after steady growth in recent years. Due to the effects of war and COVID-19, the number of food insecure people worldwide may soon reach a 15-year high [11].

The rapidly changing economic situation, under the influence of the war with the Russian Federation, economic and natural factors, presents Ukraine with

complex macroeconomic problems of providing the country's population with food and fulfilling its obligations to other countries regarding food supplies. This makes it necessary to further study the issues of ensuring food safety, taking into account modern trends.

Ukraine and the Russian Federation are among the largest producers of agricultural products in the world. Before the crisis, the total share of the world export markets of wheat and corn from Ukraine and the Russian Federation was 20 and 30 percent, respectively. In addition, countries exported about 80 percent of sunflower seed production.

The war in Ukraine, involving two of the world's largest producers of agricultural products and staple crops, is also disrupting supply chains and driving up global prices for grain, fertilizer and energy, leading to food shortages and further fuelling food price inflation.

Disruptions in the export of agricultural products caused by the war in Ukraine create increased risks in the global food and fertilizer markets due to supply constraints, unsatisfied demand for imported products and higher international prices.

Many countries heavily dependent on food and fertilizer imports, including many least developed and low-income and food-deficit countries, meet their food needs through imports, including from Ukraine. Many of them already faced the negative consequences of high world prices for food and fertilizers even before the start of a full-scale invasion [12].

The ongoing war in Ukraine raises concerns about whether crops will be harvested and whether products will be exported. Considerable uncertainty also surrounds the export outlook, given marketing difficulties, financial and transport constraints. Such a reduction in exports will lead to a further increase in the already high world prices for food products. FAO's analysis of the possible consequences of a sudden significant reduction in grain and sunflower seed exports shows that such a reduction in exports cannot be fully compensated for by the use of stocks in the 2022-2023 procurement season.

Due to the high degree of uncertainty, the FAO forecasted the situation according to two scenarios [13, 14].

If a moderate scenario is implemented, which predicts that in the 2022-2023 season, the export volume of grain and oil crops will decrease by 24 million tons, and the price of crude oil will be \$100. US per barrel, the world price for wheat will increase by 8.7%.

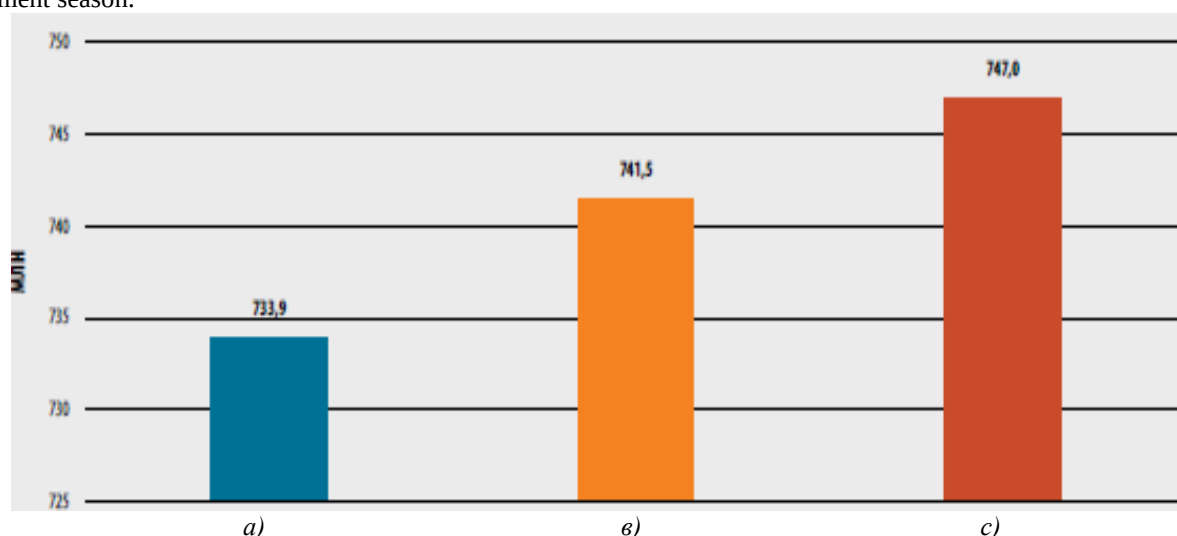
In the event of more severe changes in global grain and oilseed markets (with a total export reduction of 58 million tonnes), global wheat prices are estimated by FAO to increase by 21.5 percent from a high baseline.

Such a reduction in export volumes is also possible due to damage to land transport infrastructure and sea ports, as well as warehouse facilities and processing facilities in Ukraine. The consequences are exacerbated by the limited number of alternatives - among them the transportation of goods by rail, not water transport, and the transition from modern oilseed processing plants to smaller enterprises, in case of damage to the most important facilities. A further increase in sea transportation costs will increase the impact on the final cost of imported food products for importers.

A military conflict affecting important players in the global agricultural commodity market, at a time of already high and rising international prices for food and production inputs, raises serious concerns about the potential negative impact on global food safety.

FAO projections show that under a scenario involving moderate shocks, the global undernourishment rate will increase by 7.6 million people in 2022, while under a more severe shock the increase will be 13.1 million people compared to baseline (Figure 5).

According to the scenario that foresees a serious reduction in the volume of exports from Ukraine and the Russian Federation in 2022 and 2023 and the absence of retaliatory measures on the part of global producers, the labour force in 2023 will increase by almost 19 million people.



a) – basic scenario, b) – moderate scenario, c) – scenario with severe consequences
 Fig. 5. The impact of the war in Ukraine on the number of undernourished people in the world in 2022 [13]

A regional analysis shows that vulnerable populations in sub-Saharan Africa, the Middle East and North Africa are at the highest risk of conflict-induced increases in malnutrition (between 1.0 and 2.0 percent, respectively, for moderate and severe impacts).

The countries of sub-Saharan Africa have a low level of income and spend a significant share of their budgets on the purchase of food, and in the diet of the inhabitants of the countries of the Middle East and North Africa, a significant share is made up of imported wheat, especially that imported from Ukraine and the Russian Federation, in connection with which poor consumers from these countries become extremely vulnerable to shocks associated with rising prices for wheat, corn and vegetable oils.

In addition to the direct impact on world food supplies, the war creates a number of additional risks for the production and marketing of agricultural products. Agriculture, especially in industrialized countries, is an extremely energy-intensive industry, so it will inevitably suffer from a sharp rise in energy prices. As the prices of fertilizers and other energy-intensive products have increased due to the conflict, the prices of production inputs in general are expected to increase significantly. Rising prices for such resources will lead to increased production costs, and subsequently to rising food prices. The current situation may also lead to limited use of the means of production and a reduction in global crop production, which will create additional risk and exacerbate the negative state of affairs in the field of food safety around the world for years to come.

The war and subsequent economic sanctions against the Russian Federation may also affect exchange rates, debt levels, and overall economic growth prospects. In April 2022, the IMF published the World Economic Outlook, which predicted that the war would reduce the growth rate of the world economy from 6.1 percent (in 2021) to 3.6 percent (in 2022 and 2023).

A decrease in GDP growth rates in some regions of the world will affect the global demand for products of the agri-food sector. A long-term strengthening of the dollar, especially against the background of rising interest rates in the United States of America, could have serious negative economic consequences for developing regions and increase their debt burden. Although its impact on the global economy remains uncertain at this stage and will depend on a number of factors, it is expected that the most vulnerable countries and population groups will be hardest hit by the slowdown in economic growth and the increase in inflation, resulting in an increase in the scale of hunger and malnutrition.

The deterioration of food safety in the world occurs not only due to the increase in food prices as a result of the pandemic, but also due to disruptions in exports from the Black Sea region. This is explained by the problem of blockade of ports, increase in spending on defence and military purposes, including EU countries and other "players" of the world food market.

At the International Conference on Reconstruction of Ukraine, which took place on July 4-5, 2022 in the city of Lugano (Switzerland), the problems of the Ukrainian economy and the ways of its reconstruction

after the victory were considered. Among the investments, the attraction of which is planned according to the presented project, \$7.7 billion is provided for increasing the production of agricultural products with high added value. Namely: \$1.6 billion for the reclamation of war-damaged lands, \$1 billion for promoting the transition of the Ukrainian agricultural sector to "green" development. It is also planned to attract \$6.5 billion by 2032 for the post-war reconstruction of 10,500 Ukrainian agricultural enterprises.

Therefore, the main tasks that Ukraine will face in the field of food safety are increasing the safety of products in accordance with the requirements of international standards, developing the social infrastructure of rural areas, adapting domestic agribusiness to European and international requirements, supporting small and medium-sized businesses; creation of conditions for the transition of the agricultural sector to the principles of sustainable production.

The safety of food products for the health of citizens, by which we understand "ecological" is not the last, but the most difficult to implement in modern conditions component of food safety, because it requires special attention, both from the state in the form of support and assistance for the functioning of the agro-industrial complex and creating conditions for the necessary imports, as well as for the producers themselves, putting them in front of many challenges.

"Environmental" business began to develop in response to the growing level of awareness about the environment and the impact of industry and consumers on the environment. The governments of the world's leading countries introduced environmental norms and standards, and representatives of small and medium-sized enterprises (SMEs) began to produce ecological and safe products in order to comply with the established requirements and to satisfy the demanding consumer.

Growing public awareness of how lifestyles and consumer choices affect the environment has fuelled demand for eco-friendly products that minimize environmental impact.

Today, agribusiness offers and uses some solutions to improve food supply, such as the production of ecological products, secondary processing, safe management of secondary raw materials, the use of drones, the introduction of services for providing agrometeorological data related to weather conditions in a "specific field", etc.

It is important to use the experience of leading countries, including the implementation of EU strategies and initiatives. The Ukrainian Economic and Trade Association (UBTA) initiated before the government of Ukraine to support the strategy "From Flock to Table" and the implementation of the "Green Deal" strategy adopted at the level of the member states of the European Union.

The "Fork to Table" strategy is aimed at accelerating the transition to a sustainable food system. This Strategy is the basis of the European "Green Deal", the purpose of which is to provide a comprehensive solution to the problems of food systems and food safety.

Its main idea is the connection "healthy population - healthy society - healthy planet".

Conclusion

The deterioration of the state of food safety, both in Ukraine and in the world, occurs in conditions where the world has not yet overcome the consequences of the crisis caused by the COVID-19 pandemic, which deepened with the military invasion of Russia on the territory of Ukraine.

The destruction of agriculture as an industry has economic, social and environmental components.

Undoubtedly, for the recovery of the country and for further processes of obtaining compensations and reparations in the courts, the state needs a comprehensive assessment of the damage caused, which affects the provision of food safety, has economic consequences at the macro level and threatens the ecological safety of society for years.

The environmental situation in cities where hostilities are actively taking place is extremely dire.

It is important to understand that solving food safety issues does not wait for victory. Today, there are already a number of important environmental initiatives that require urgent implementation. And the first thing that needs to be created is an electronic database of information on losses in the agricultural sector. This will provide an opportunity not only to assess the damage financially and to have information about the current state of the destruction of infrastructure facilities, but also to have information to assess the negative impact on the environment.

Taking into account the negative consequences that affect the state of the environment after the explosion of the Kakhovka HPP and the flooding of large areas located in the lower reaches of the Dnipro, the necessary measures should be taken to prevent threats to the physical health of the population and to prevent an environmental disaster.

All sectors of the agrarian industry, the cultivation of agricultural crops, animal husbandry, and the processing industry were threatened by the consequences of environmental problems. Even before the war, there was a problem with the disposal of dead animals. Today, this problem has deepened.

One of the common mechanisms used in the leading countries of the world to assess the condition of soils is the use of drones. In the situation that has developed in Ukraine, their functions can be expanded to carry out demining of agricultural lands.

FAO specialists conducted an analysis of contamination of Ukrainian lands with chemical and metal objects. Every sinkhole in Ukrainian chernozems is actually a place of water erosion. If you do not take the necessary measures to remove pollutants from the soil, after a few years this area can turn into a "moonscape", especially in those places where active hostilities took place [15].

The implementation of the European Union's "Farm to Table" strategy in Ukraine and the implementation of the "Green Deal" strategy adopted at the level of the member states is extremely important for Ukraine. Since the Strategy is aimed at accelerating the transition to a sustainable food system.

This became especially relevant for our country after receiving the status of an EU candidate country, which obliges Ukraine to bring its national policy into line with EU policy. And the implementation of the "Green Agreement" is a necessary prerequisite for further European integration [16].

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