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FOOD SECURITY OF UKRAINE: ESTIMATION OF FACTORS' IMPACT, POSTWAR TRENDS AND WAYS TO SUPPLY

ABSTRACT

The study aimed to determine Ukraine's food security level, and develop the main directions for its increase. To realize the research purpose several tasks were conducted. Firstly, to calculate Ukraine's Food Security Index and compare it with the average World and average European Food Security Index. Secondly, make a forecast of Ukraine's Food Security Index for the next 5 years, and assess its trends. Thirdly, to establish the main factors that have an impact on Ukraine's Food Security Index. Fourthly, to identify the main bottlenecks and, on the basis of these data, propose the main directions for increasing the level of Ukraine's food security.

The global environmental crisis has significantly increased the risk of food insecurity in the world and the likelihood of famine in certain regions. Besides, Russia's war against Ukraine, which destroyed the supply chain infrastructure and exacerbated the problems of providing food to the population, updated the researched issues. Accordingly, the research aimed at identifying the "bottlenecks" of Ukraine's Food Security and developing directions for increasing its level.

Based on the results of theoretical and empirical research, the main "bottlenecks" of the process of ensuring food security have been identified and directions for increasing its level have been established.

The study carried out the calculation and forecasting of Ukraine's Food Security Index. Moreover, the paper proposed a method of determining the main "bottlenecks" of Ukraine's Food Security Index by assessing the influence of various factors. Based on the analysis, the study developed the main directions for increasing Ukraine's food security level.

Keywords: food security, national security, forecast, affordability, availability, «bottlenecks», Pearson correlation coefficient

JEL Classification: C40, C53, H56, Q18

INTRODUCTION

Global environmental trends reveal that the problem of providing the population with food is becoming increasingly important. Depletion of natural resources, ocean resources, soil depletion, and a high level of ecosystem pollution has led to the emergence of a global environmental crisis (Dudiuk & Hobela, 2015). This crisis has worsened due to the gradual increase in the planet's population. Instead, the global environmental crisis and the influence of other factors caused the food crisis. Deep problems with food prices and food shortages began to arise at the beginning of the 21st century, with the onset of the global economic crisis (Bernard de Raymond et al., 2021). It is also increasing due to the influence of global crisis phenomena, in particular the world economic crisis, and the COVID-19 pandemic (Ma et al., 2021). Viewing such trends, we can argue that the model of socioeconomic development in the future should contain mechanisms for solving these problems (Ortynskiy, et al., 2021).

The pandemic exacerbated food insecurity in countries with food shortages (Bai et al., 2020). However, recent research suggests that food crises can also affect countries that have not experienced food problems (Béné et al., 2021). In general, the consequences

of the pandemic will have a significant impact on the economic and food security of most countries of the world and will require a rethinking of food policy. Some studies suggest that the number of victims of a pandemic may be fewer than those of a famine caused by this pandemic (Rahaman et al., 2021).

In addition, there is an increase in military tension in several regions of the world. In particular, in Europe, Russia's war against Ukraine, which began in a hybrid form in 2014 and continued in the active war in 2022, significantly affected the food security of the region and the world in general. The reason for this was the fact that Ukraine is a significant supplier of food on the world market. Therefore, the study of the main factors influencing food security, its forecasting and ways of ensuring it is an actual direction of scientific research.

To summarize, we can suppose that food security is becoming an important element in ensuring the security of present and future generations.

LITERATURE REVIEW

Several global threats in recent years have contributed to the emergence of many problems in the field of global food supply. In general, some countries are already experiencing particular problems. Accordingly, scientific research in this area intensified. Separate studies claim that the number of people on the planet will continue to grow and in 2050 humanity will need 70% more food (King et al., 2017). It is quite difficult to predict whether the development of science and biotechnology will be able to solve the problem of agricultural productivity. However, there is no doubt about the necessity to strengthen scientific research in this area.

Of course, a large amount of research is dedicated to the analysis of global environmental problems and global warming's impact on food safety. Scientists searched for new technological solutions to increase the productivity of agricultural production and reduce the use of non-renewable resources in agriculture (Mc Carthy, 2018). Furthermore, scientists have investigated seed stock improvement processes and their impact on quality and productivity in agriculture (Nabuuma, et al., 2022). There are also interesting studies on solving the problems of food security in large cities through the use of modern technologies and innovations. Besides, large cities and agglomerations are the first to experience the overpopulation problem (Mok, Tan & Chen, 2020). The issue of high consumption of water, which is necessary for agricultural production, remains a significant problem. In general, global warming has contributed to this problem. Scientists were looking for ways to minimize water consumption in farming (Sapkota, 2018). Another study contains an analysis of safety issues related to wildlife and emphasizes the importance of such studies to counter potential threats to food safety (Wei, 2020).

Scientists attach great importance to the study of the quality of food products and their impact on food safety. In particular, the investigation is devoted to the analysis of the nutritional value of different types of products and their impact on human health (Wan, Tai & Du, 2021). It is worth paying attention to research that determines the impact of demand for natural products on the general level of food security in the world and the relevance of FAO standards. Scientists have investigated whether such a trend will affect the structure of world demand for products (McGill, 2009).

Interesting investigations related to the study of the food supply chain and the determination of product losses. Researchers emphasize the need to form a circular model of "production-consumption-recycling/reproduction-consumption" instead of the classical linear model of "production-consumption", which will contribute to the achievement of long-term sustainable development goals (Wang, Yuan, & Tang, 2021). Equally important is food processing to save food costs. Researchers emphasize the importance of monitoring the energy value of food, its quality, and the study of factors influencing consumer choice (Augustin, et al., 2016). At the same time, scientists are investigating the impact of current and future food waste on ecology and nature, especially in urban agglomerations. The problem of food waste is considered by researchers to be one of the most important problems in the future (Ogunmoroti, Min, Li, Liu, 2022).

Scientists also did not ignore the approaches to assessing the state of food security and the corresponding indicators. Their verification and effectiveness of application were investigated (Poudel & Gopinath, 2021). In addition, the scientists investigated the approaches for assessing the enterprise economic security in the agricultural sector (Pushak, et al., 2021). Moreover, the researchers had studied the peculiarities of Russian-Ukrainian war impact on the food security (Pushak, et al., 2022) and war's impact on labor security (Sokolovska, et al., 2022).

Despite the significant number of researches, some research gaps must be filled in. It is about the study of food security of the state and the influence of factors that affect it in the conditions of war. Establishing these factors will allow more effective responses to problems in the field of food security.

AIMS AND OBJECTIVES

The study aimed to determine Ukraine's food security level, establish its main bottlenecks, and develop the main directions for its increase. To realize the research purpose several tasks were conducted. Firstly, to calculate Ukraine's Food Security Index and compare it with the average World and average European Food Security Index. Secondly, make a forecast of Ukraine's Food Security Index for the next 5 years, and assess its trends. Thirdly, to establish the main factors that have an impact on Ukraine's Food Security Index. Fourthly, to identify the main bottlenecks and, on the basis of these data, propose the main directions for increasing the level of Ukraine's food security.

METHODS

To complete the study objectives, we used a set of scientific research methods, which constructed the study methodology. The implementation of the research involved several successive stages.

Firstly, the determination of the country's food security index. The structure of the calculation of this index involves the calculation of several of its components.

Affordability is the first component, which includes the following indicators: change in average food costs, proportion of the population under the global poverty line, inequality-adjusted income index, agricultural trade, and food safety net programs.

Availability is the second component, which includes the following indicators: access to agricultural inputs, agricultural research and development, farm infrastructure, volatility of agricultural production, food loss, supply chain infrastructure, sufficiency of supply, political and social barriers to access, food security and access policy commitments.

Quality and Safety is the third component, which includes the following indicators: dietary diversity, nutritional standards, micronutrient availability, protein quality, and food safety.

Sustainability and Adaptation is the fourth component, which includes the following indicators: exposure, water, land, oceans, rivers and lakes, political commitment to adaptation, and disaster risk management.

To determine the country's food security index, use the formula:

$$I_{FS} = \frac{(AF_i \times V_{AF_i}) + (AV_i \times V_{AV_i}) + (QS_i \times V_{QS_i}) + (SA_i \times V_{SA_i})}{100}, \quad (1)$$

where: I_{FS} – food security index; AF_i – affordability indicator; V_{AF_i} – value of affordability indicator; AV_i – availability indicator; V_{AV_i} – value of availability indicator; QS_i – quality and safety indicator; V_{QS_i} – value of quality and safety indicator; SA_i – sustainability and adaptation indicator; V_{SA_i} – value of sustainability and adaptation.

The weighting factors of these indicators will be presented in Table 1. They are determined in accordance with the methodology developed by the Economist Intelligence Unit.

	Indicator	Value, %
1	Affordability	32.4
2	Availability	32.4
3	Quality and Safety	17.6
4	Sustainability and Adaptation	17.6

Secondly, forecasting is applied to determine the trend and potential value of indicators by using formulas:

$$P = a + bx; \quad (2)$$

where:

$$a = \frac{y - bx}{n}; \quad (3)$$

$$b = \frac{\sum (x-\bar{x})(y-\bar{y})}{\sum (x-\bar{x})^2}; \quad (4)$$

Thirdly, the paper used correlation analysis, namely the calculation of the Pearson correlation coefficient to determine the influence of factors (x_1, x_2, \dots, x_n) on the dependent variable (y). The correlation dependence was determined using the following formulas:

$$r_x = \frac{\sum_{i=1}^m (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum_{i=1}^m (x_i - \bar{x})^2 \times \sum_{i=1}^m (y_i - \bar{y})^2}} = \frac{cov(x, y)}{\sqrt{s_x^2 s_y^2}}; \quad (5)$$

where: \bar{x}, \bar{y} – sample means x^m, y^m ; $s_x^2; s_y^2$ – sample variances.

In addition, the study used other research methods. In particular, the method of comparison and analogies for evaluating the food security index, consisted in comparing the data of Ukraine, the average value of this index in Europe and the world. Moreover, the method of synthesis to identify the factors influencing the state's food security was used in the research. The use of the graphic method made it possible to interpret several research results in the form of graphs. The induction method was used to form directions for increasing the level of food security. The formation of conclusions and further directions of research took place with the help of methods of abstraction and theoretical generalization.

RESULTS

Food security is of utmost importance to a country, especially if that country is at war. The state's food security status can be assessed using the Food Security Index. At this stage of our research, we will calculate the value of the food security index for Ukraine for the period 2012-2022. To implement such calculations, we will use the formula (1). The results of the calculations are presented in Table 2.

Table 2. Results of the food security index of Ukraine calculation. (Source: Calculated using State Statistic Service of Ukraine, 2022; World Bank, 2022; OECD, 2022; National Bank of Ukraine, 2022)

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	
Affordability	Change in average food costs	6.5	-2.1	-2.1	12.1	45.8	9.9	12.9	11.3	8.0	2.7	10.7
	Proportion of population under the global poverty line	0.2	0.2	0.2	0.1	0.1	0.5	0.4	0.3	0.4	0.2	0.1
	Inequality-adjusted income index	0.643	0.646	0.648	0.648	0.660	0.648	0.653	0.663	0.669	0.675	0.675
	Agricultural trade											
	Agricultural import tariffs	9.5	9.5	9.2	9.2	9.2	9.2	9.2	9.2	9.2	9.1	9.1
	Trade freedom	84.4	84.4	86.2	85.8	85.8	85.9	81.1	75.0	81.2	79.2	78.6
	Food safety net programmes											
	Presence of food safety net programmes	1	1	1	1	1	1	1	1	1	1	1
	Funding for food safety net programmes	0	0	0	0	0	0	0	0	0	0	0
	Coverage of food safety net programmes	1	1	1	0	0	0	0	0	0	0	0
Operation of food safety net program	1	1	0	0	0	0	0	1	1	1	1	
Availability	Access to agricultural inputs											
	Access to finance and financial products for farmers	1	1	1	1	1	1	1	1	1	1	1
	Access to diversified financial products	0	0	0	1	1	1	1	1	1	1	1
	Agriculture producer prices	9.73	-3.41	1.57	23.19	53.34	13.60	13.09	10.72	0.48	13.34	5.80
	Access to extension services	1	1	1	1	1	1	1	1	2	2	2
	Community organizations	2	2	2	2	2	2	2	2	2	2	2
	Empowering women farmers	0	0	0	0	0	0	0	0	0	0	0
	Agricultural research and development											
	Public expenditure on agricultural research and development	0.19	0.16	0.14	0.13	0.08	0.06	0.05	0.10	0.09	0.10	0.09
	Access to agricultural technology education and resources	0.027	-0.092	0.058	0.082	0.051	0.205	0.000	0.060	0.085	-0.096	0.048
	Commitment to innovative technologies	1	1	1	1	1	1	1	1	1	1	1
	Farm infrastructure											
	Crop storage facilities	1	1	1	1	1	1	1	1	1	1	1
	Irrigation infrastructure	5.28	5.26	5.25	5.21	5.22	5.22	5.22	5.22	5.24	5.24	5.24
	Access to market data and mobile banking	117.8	121.9	130.9	138.4	144.3	142.0	133.2	131.4	127.7	130.6	129.3
Volatility of agricultural production	0.18	0.24	0.23	0.19	0.18	0.19	0.10	0.09	0.08	0.08	0.08	

(continued on next page)

Table 2. (continued)

		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Availability	Food loss	4.02	4.02	4.32	4.76	5.21	5.35	6.04	4.96	4.66	4.58	5.52
	Supply chain infrastructure											
	Planning and logistics	2.57	2.85	2.85	2.98	2.98	2.74	2.74	2.83	2.83	2.83	2.83
	Road infrastructure	1	1	1	1	1	1	1	1	1	1	0
	Air, port and rail infrastructure	1.3	1.3	1.3	1.3	1.3	1.7	1.7	1.7	1.7	2.0	1.0
	Sufficiency of supply											
	Food supply adequacy	128	127	127	127	127	126	126	125	125	125	125
	Dependency on chronic food aid	1	0	1	1	0	0	0	0	0	1	1
	Political and social barriers to access											
	Armed conflict	0	1	4	4	4	4	4	4	4	4	4
	Political stability risk	60	75	70	70	65	75	75	75	60	65	90
	Corruption	4	4	4	4	4	4	4	4	4	4	4
	Gender inequality	0.334	0.327	0.319	0.313	0.302	0.288	0.282	0.273	0.270	0.234	0.234
	Food security and access policy commitments											
Food security strategy	0	0	0	0	0	0	0	0	0	0	0	
Quality and Safety	Dietary diversity											
	Share of non-starchy foods	58	58	58	59	59	57	54	52	52	52	52
	Share of sugar consumption	14.1	14.0	13.5	14.3	14.2	12.4	12.0	11.5	11.8	11.8	11.8
	Nutritional standards											
	National dietary guidelines	0	0	0	0	0	2	2	2	2	2	2
	National nutrition plan or strategy	0	0	0	1	1	1	1	1	1	1	1
	Nutrition labeling	0	0	0	0	0	0	0	1	1	1	1
	Nutrition monitoring and surveillance	1	0	0	0	0	0	0	0	0	0	0
	Micronutrient availability											
	Dietary availability of vitamin A	2	2	2	2	2	2	2	2	2	2	2
	Dietary availability of iron	13.4	13.4	13.4	12.9	12.9	12.9	12.4	12.4	12.4	12.4	12.4
	Dietary availability of zinc	7.19	7.19	7.19	7.32	7.32	7.32	7.31	7.31	7.31	7.31	7.31
	Protein quality	82.8	82.8	82.8	94.9	94.9	94.9	81.6	81.6	81.6	81.6	81.3
	Food safety											
	Relevant food safety legislation	2	2	2	2	2	2	2	2	2	2	2
	Food safety mechanisms	97	92	93	85	100	100	53	80	60	60	60
Access to drinking water	95.1	94.6	94.2	94.0	93.6	93.7	93.7	93.8	93.9	93.9	93.9	
Sustainability and Adaptation	Exposure											
	Temperature rise	49.6	49.6	49.6	49.6	49.6	49.6	49.6	49.6	49.6	49.6	49.6
	Drought	4	4	4	4	4	4	4	4	4	4	4
	Flooding	10.20	10.20	10.20	10.20	10.20	10.20	10.20	10.20	10.20	10.20	10.20
	Sea level rise	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016
	Water											
	Agricultural water risk – quantity	3	3	3	3	3	3	3	3	3	3	3
	Agricultural water risk – quality	5	5	5	5	5	5	5	5	5	5	5
	Land											
	Land degradation	25	25	25	25	25	25	25	25	25	25	25
	Grassland	96.5	96.7	96.7	96.8	96.8	96.8	96.9	97.4	97.4	97.4	97.4
	Forest change	0.07	0.10	0.13	0.16	0.19	0.22	0.23	0.23	0.24	0.24	0.24
	Soil organic content	73.31	73.31	73.31	73.31	73.31	73.31	73.31	73.31	73.31	73.31	73.31
	Oceans, rivers and lakes											
	Eutrophication	1	1	1	1	1	1	1	1	1	1	1
	Marine biodiversity	2.4	3.5	11.8	11.8	11.8	11.8	11.8	11.8	11.8	11.8	11.8
	Political commitment to adaptation											
	Climate finance flows	4.21	5.70	15.13	11.72	12.16	23.05	38.69	23.68	19.91	19.54	24.31
	Environmental-economic accounting implementation	0	0	0	0	0	0	0	0	2	2	2
	Early-warning measures / climate-smart Agriculture	0	0	0	0	0	0	0	0	0	0	0
Commitment to managing exposure	0	0	0	0	0	0	0	0	0	0	0	
National agricultural adaptation policy	0	0	0	0	1	1	1	1	1	1	1	
Sustainable agriculture	1	1	1	1	1	1	1	1	1	1	1	
Disaster risk management												
Pest infestation and disease mitigation	0	0	0	0	0	0	0	0	0	0	0	
Risk management coordination	0	0	100	93	100	93	93	93	93	93	93	

In general, the food security index of Ukraine shows not entirely positive dynamics. To understand the general trend, we will compare the value of the index and its components with the average value of the countries in the world (Figure 1).

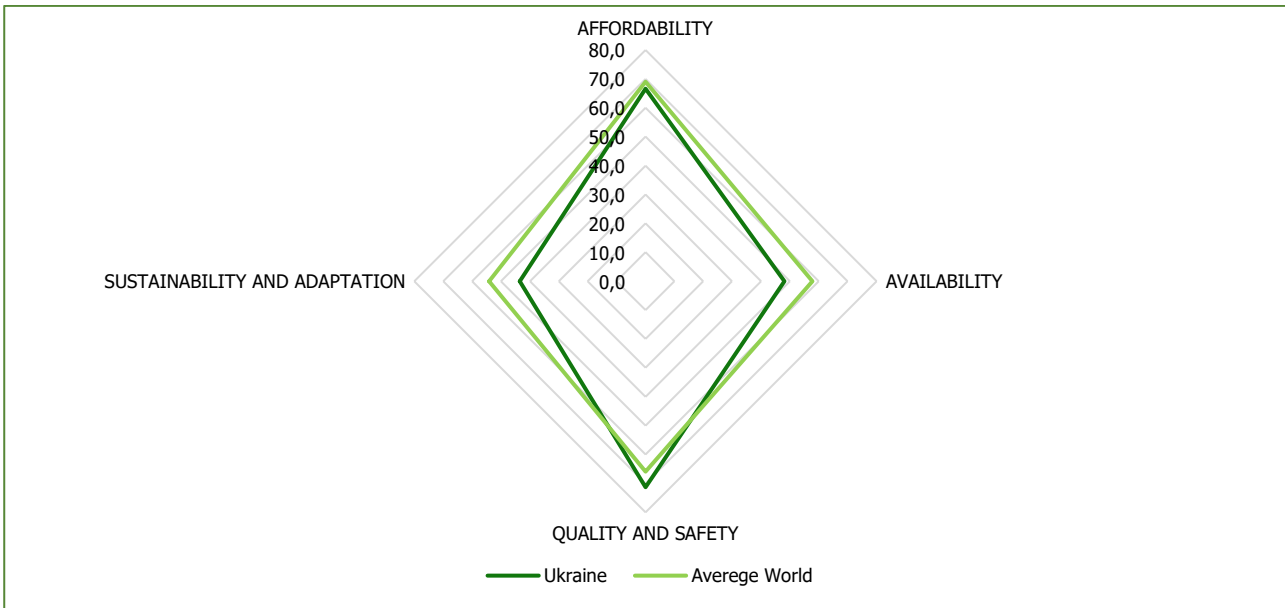


Figure 1. Comparison of Ukraine's FSI and the average World's FSI.

As the graph displays, three components of the index have a value less than the world average for 2022. Only the Quality and Safety indicator is greater than the world average. Taking into account the geographical position of Ukraine and its European integration intentions, we will compare Ukraine's FSI and the average FSI of European countries. (Figure 2).

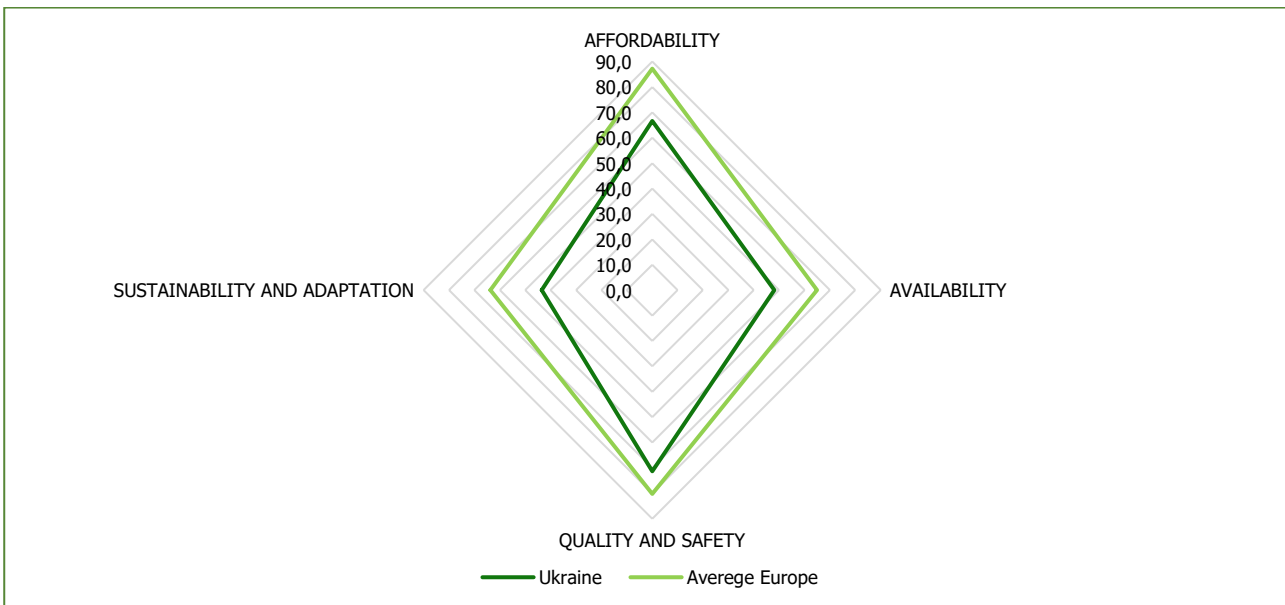


Figure 2. Comparison of Ukraine's FSI and the average Europe's FSI.

An equal trend can be seen in Figure 2. That is, the food security index for all four components is lower than the average European value. This trend is quite threatening to the economic and national security of Ukraine.

Therefore, taking into account the current threats to the security of the state, namely Russia's war against Ukraine and the socio-economic crisis caused by the COVID-19 pandemic, it is important to determine the future trends of the state's food security index. We will forecast the dynamics of this index using the methodology described by formulas (3), (4) and (5). We present the forecasting results graphically in Figure 3.

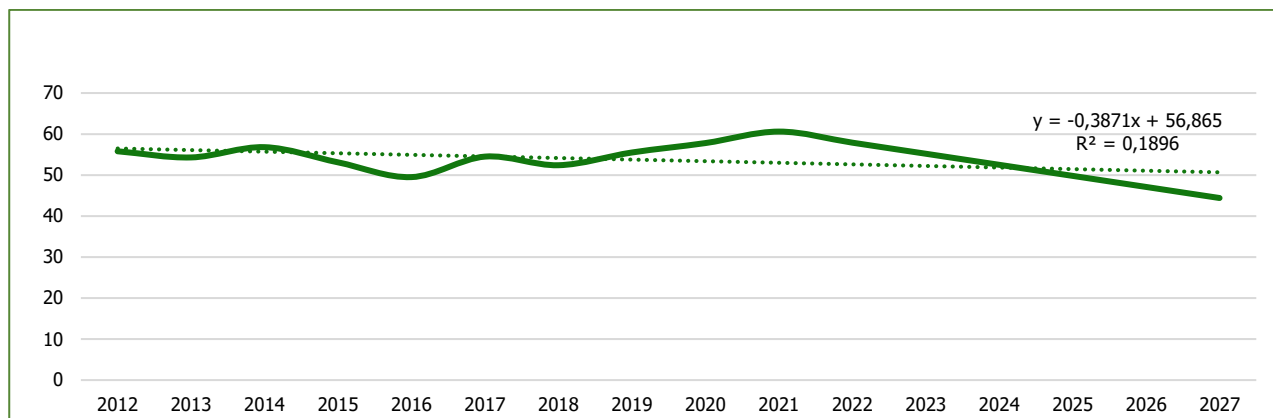


Figure 3. The forecast of Ukraine's Food Security Index.

Based on the forecasting results, we can conclude the downward trend of the food security index for the period 2022-2027. Accordingly, there is an urgent need to take measures to eliminate such a trend and improve the value of the index, which is extremely important for the state's security, especially in war conditions.

To form recommendations for improving the state's food security, it is necessary to identify "bottlenecks" in the food security system. Therefore, having calculated the index of food security of Ukraine for the period 2012-2022, we will proceed to the next stage of the research, which consists in establishing those factors that have the most significant impact on the state's food security. To do this, we will conventionally divide these factors into two types: factors of internal influence and external influence. The factors of internal influence are considered to be the influence of the indicators included in the food security index on the index itself. Factors of external influence are considered to be the influence of macroeconomic factors that to some extent interact with food security. The calculation of internal and external factors' influence will be determined by using the Pearson correlation coefficient.

When calculating the factors of internal influence, the dependent variable (y) in this case will be the food security index, and the factors whose influence will be evaluated are Affordability (x1), Availability (x2), Quality and Safety (x3), Sustainability and Adaptation (x4). To determine the influence of these factors, we will use formula (2). The results of the calculations will be presented in the table. 3.

Table 3. Calculation of the internal factors' influence on Ukraine's food security.

	y	x ₁	x ₂	x ₃	x ₄
y	–	0.62	0.81	0.22	0.21
x ₁	–	–	0.30	-0.54	-0.53
x ₂	–	–	–	0.38	0.20
x ₃	–	–	–	–	0.66
x ₄	–	–	–	–	–

To determine the degree of influence, we will use the rating scale proposed (Economist Intelligence Unit, 2022). The results are presented in Table 4.

Table 4. The influence of factors (x1, x2, x3, x4) on the dependent variable (y).

	Range of indicators	Level of influence	Factor
1	01 – 0.25	weak impact	x ₃ , x ₄
2	0.25 – 0.5	below average impact	–
3	0.5 – 0.8	average impact	x ₁
4	0.8 – 0.99	strong impact	x ₂

The study results indicate that the factor x2 – availability and average impact on Food Security Index has factor x1 – affordability have a strong impact on the food security index.

The next stage will be to determine the extent of the influence of external factors on the Security Index of Ukraine. When calculating the factors of external influence, the dependent variable (y) will also be the food security index, and the factors whose influence will be evaluated are as follows: Inflation Index ($x_{2.1}$), Income of the Population ($x_{2.2}$), Minimum Salary ($x_{2.3}$), GDP per capita ($x_{2.4}$), Average Salary ($x_{2.5}$). To determine the influence of these factors, we will use formula (2). The results of the calculations are presented in Table 5.

Table 5. Calculation of the external factors' influence on Ukraine's food security.

	y	$x_{2.1}$	$x_{2.2}$	$x_{2.3}$	$x_{2.4}$	$x_{2.5}$
y	–	-0.13	0.53	0.64	0.55	0.58
$x_{2.1}$	–	–	-0.15	-0.15	-0.09	-0.12
$x_{2.2}$	–	–	–	0.99	0.99	0.99
$x_{2.3}$	–	–	–	–	0.99	0.99
$x_{2.4}$	–	–	–	–	–	0.38
$x_{2.5}$	–	–	–	–	–	–

The results of determining the factors' influence are presented in Table 6.

Table 6. The influence of factors ($x_{2.1}$, $x_{2.2}$, $x_{2.3}$, $x_{2.4}$) on the dependent variable (y).

№	Range of indicators	Level of influence	Factor
1	01 – 0.25	weak impact	$x_{2.1}$
2	0.25 – 0.5	below average impact	–
3	0.5 – 0.8	average impact	$x_{2.2}$, $x_{2.3}$, $x_{2.4}$, $x_{2.5}$
4	0.8 – 0.99	strong impact	–

The results of the correlation analysis indicate a relatively weak influence of external factors on Ukraine's food security. Most indicators have an average impact.

Summarizing the results of the calculation of the Pearson correlation coefficient, we can state that the availability indicator has the most significant influence on the state of the food security index. Thus, the greatest impact on the food security index is Availability. That is why we will pay more attention to the identification of the components of this indicator, since improving their value will contribute to ensuring the food security of Ukraine. Table 7 shows the score and security meaning of availability indicators for determining "bottlenecks".

Table 7. Security meaning of availability indicators.

№	Indicator	Meaning
1	Access to agricultural inputs	good
2	Agricultural research and development	weak
3	Farm infrastructure	good
4	Volatility of agricultural production	good
5	Food loss	moderate
6	Supply chain infrastructure	very weak
7	Sufficiency of supply	very good
8	Political and social barriers to access	very weak
9	Food security and access policy commitments	very weak

The study results made it possible to identify the main "bottlenecks", which made it possible to determine the main directions for improving the food security index of Ukraine. Accordingly, the main bottlenecks are:

- agricultural research and development;
- supply chain infrastructure;

- political and social barriers to access;
- food security and access policy commitments.

So, the main directions of strengthening the food security of Ukraine are:

- state support and development of agricultural research, it is not only about scientific activity, but also stimulation of the development of agricultural education;
- development and improvement of supply chain infrastructure of Ukraine;
- improvement of legislation in the field of food security to overcome political and social barriers to access the agricultural market of Ukraine;
- improvement of food safety policy and simplification of access to food markets in Ukraine.

The implementation of these main directions will have a significant contribution not only to ensuring food security in Ukraine but will also have a significant impact on Ukraine's victory in the war with Russia. At the same time, ensuring Ukraine's food security will contribute to the food supply of a number of countries in the Middle East and Africa. Accordingly, increasing the level of food security in Ukraine will have a positive effect on the level of global food security.

DISCUSSION

Based on the used methodology, we can identify the main bottlenecks. This will make it possible to quickly and effectively implement measures to neutralize "bottlenecks" and increase the state's food security level. It is advisable to direct further scientific research in the direction of the development of legal and administrative-economic measures to ensure the food security of the state.

CONCLUSIONS

The study highlights the importance of ensuring state food security in conditions of global challenges and threats. Further, the paper emphasized the importance of researching the ways of ensuring Ukraine's food security since the war with Russia. At the same time, the food security of several countries in the world depends on the supply of food from Ukraine. The Economist Intelligence Unit methodology was used to calculate the food security index of Ukraine. As a result of calculating the specified index and comparing the value of its components with similar values with other countries of the world, the study made a conclusion about the negative dynamics of the food security index of Ukraine. During the analyzed period, its value is significantly lower than the average values of the countries of the World and Europe. The value of this index was forecast for the period 2022-2027 and its downward trend was determined. As a result of empirical research, the main "bottlenecks" of Ukraine's food security index were established, namely: agricultural research and development, supply chain infrastructure, political and social barriers to access, food security and access policy commitments. Based on the analysis, the research developed the main directions for improving Ukraine's food security. These measures include state support and development of agricultural research; development and improvement of the supply chain infrastructure of Ukraine, and improvement of legislation in the field of food security to overcome political and social barriers to access.

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ПРОДОВОЛЬЧА БЕЗПЕКА УКРАЇНИ: ОЦІНКА ФАКТОРІВ УПЛИВУ, ПОСТВОЄННІ ТЕНДЕНЦІЇ ТА ШЛЯХИ ЗАБЕЗПЕЧЕННЯ

Метою дослідження є визначення загального рівня продовольчої безпеки України та розробка основних напрямів підвищення її рівня. Реалізація мети дослідження втілювалась у виконанні кількох завдань. По-перше, розрахувати індекс продовольчої безпеки України та здійснити його порівняння із середньосвітовими та середньоєвропейськими даними. По-друге, здійснити прогнозування індексу продовольчої безпеки України на наступні 5 років, оцінити його тренд та тенденції. По-третє, установити основні фактори зовнішнього та внутрішнього середовища, що мають вплив на стан індексу продовольчої безпеки. По-четверте, визначити основні напрями підвищення рівня продовольчої безпеки України.

Глобальна екологічна криза значною мірою підвищила небезпеку погіршення стану продовольчої безпеки у світі та ймовірність настання голоду в певних регіонах. Посиленню уваги до досліджуваної проблематики сприяла війна Росії проти України, що знищила інфраструктуру ланцюгів постачання та посилила проблеми забезпечення продовольством населення. Дослідження спрямоване на визначення основних «вузьких місць» продовольчої безпеки України та розробку напрямів підвищення її рівня.

Ґрунтуючись на результатах теоретичних та емпіричних досліджень, визначено основні «вузькі місця» процесу забезпечення продовольчої безпеки та встановлено напрями підвищення її рівня.

У дослідженні здійснено розрахунок та прогнозування індексу продовольчої безпеки України. Запропоновано методику визначення основних «вузьких місць» продовольчої безпеки шляхом оцінки впливу інфернальних та екстернальних факторів. На основі цього аналізу розроблено основні напрями підвищення рівня продовольчої безпеки держави.

Ключові слова: продовольча безпека, національна безпека, прогноз, економічна доступність, фізична доступність, «вузькі місця», коефіцієнт кореляції Пірсона

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