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ENSURING FOOD SECURITY OF UKRAINE IN THE CONTEXT OF SUSTAINABLE DEVELOPMENT

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Abstract. The article presents a comprehensive analysis of the current state of food security in Ukraine in the context of achieving the Sustainable Development Goals, in particular Goal 2: Zero Hunger. The *purpose of the article* is to assess the current state of food security in Ukraine within the strategic framework of sustainable development of the agri-food sector. The *research methodology* included a thorough review of the literature on the topic, identification of critical problematic aspects, assessment of the current state of food security in the country based on the calculation and evaluation of individual food security indicators (regional food self-sufficiency indices, indices of population consumption of staple foods, global GFSI ratings). The comprehensive nature of the research lends considerable weight to the findings. An analysis of the global economic availability of food was conducted. The study examined the dynamics of price indices for the principal categories of food products and the dynamics of the global food affordability index. A detailed analysis was conducted to evaluate Ukraine's global ranking in terms of food security and its intrinsic value. The following represents an assessment of the current supply of essential food products to the population of Ukraine. The assessment is conducted on a regional basis. The findings revealed a notable disparity in food security assurance practices across Ukraine's regions. The article identifies the principal problematic aspects of the current state of ensuring food security in Ukraine within the context of the elements of the trilemma of sustainable development: economic, social, and environmental. The authors put forth a conceptual framework for ensuring food security through sustainable development. The core elements of the proposed mechanism are defined as strategic state initiatives for transformative transformations towards further sustainable development of the national economy, social responsibility of agri-food businesses and food consumers, eco-innovations, and socially responsible investments. The potential impact of this mechanism is considerable, offering hope for a more secure and sustainable future.

Keywords: food security, hunger, agri-food sector, sustainable development, food, prices, social responsibility.

JEL Classification: Q10, Q18, H53

1. Introduction

It is the responsibility of any state to ensure food security, regardless of its level of socio-economic development. The active development of society and significant progress in the economic well-being of the world's population remain necessary to overcome the global problem of hunger. It is estimated by the FAO that approximately 9.2% of the global population is affected by chronic malnutrition and hunger. In 2022, the number of individuals belonging to this demographic reached 783 million. This issue is most pronounced in countries across the African continent, where the prevalence of undernourishment stands at 19.7% (The State of Food Security and Nutrition in the World 2022). The countries of Central and Eastern Africa, South Asia, and the Caribbean exhibit the highest levels of risk associated with malnutrition and low food security.

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The global aspiration to overcome hunger is realised through the lens of the trilemma of sustainable development, which encompasses ecological, social, and economic dimensions. It is only through the interaction of these three essential components that it is possible to achieve sustainable development goal No. 2, Zero Hunger (The 17 GOALS), under conditions of natural potential preservation and consideration of the interests of both present and future generations.

Ukraine plays an active role in global processes aimed at achieving sustainability and enhancing the well-being of the global population, with a particular focus on ensuring global food security. Ukraine's exceptional natural resource potential in agriculture makes it a powerful exporter of food, which the global community requires to address the issue of food insecurity. Concurrently, the implementation of this resource in accordance with the latest global trends and requirements is feasible primarily through sustainable development, which should also serve as a national reference point for future endeavours.

2. Literature Review

In recent years, the concept of sustainable development has emerged as a crucial factor in the European Union's agri-food sector. Scientists are actively assessing the state of food security with a focus on sustainable development criteria and indicators. This includes the promotion of organic farming (Szaryszová et al., 2023), ensuring the quality, safety and environmental friendliness of agricultural products and food (Bawadi et al., 2012), and preserving the natural environment and achieving climate neutrality in agri-food production (Lee et al., 2024).

S. Ahn and F. B. Norwood (2021) investigate the practical implementation of sustainable development principles in achieving food security through the creation of sustainable logistics supply chains. E. Antamoshkina & A. Rogachev (2020) argue that the economic component of the trilemma of sustainable food security is the dominant factor, given the context of population income level, food prices, and economic availability of all categories. S. Stepanenko et al. (2023) propose a strategy for ensuring food security, which entails deepening the implementation of the principles of an inclusive economy with an emphasis on the social responsibility of business.

The conservation of resources and the search for opportunities to restore natural resource potential (agricultural land, biodiversity, water, and forest resources) are considered a vital element of a sustainable approach to food security management (Anderson & Rivera-Ferre, 2021). This approach is also espoused by F. Santeramoa and M. Kangc (2022), who posit that the primary objective of attaining food security in accordance with sustainable development tenets is to guarantee climate neutrality and curtail CO_2 emissions within the agri-food industry.

There is widespread agreement among academics and practitioners that sustainable development in the agri-food sector depends on ecological innovations. These innovations, which encompass all components of the sustainable development trilemma – economic, social and environmental – are seen as the basis for progress (Adenle et al., 2019; De Luca et al., 2018; Stepanenko et al., 2023; Santeramoa & Kangc, 2022).

N. Shvets et al. (2023) propose the dissemination of innovative bio- and digital technologies in agri-food systems as the highest priority innovation for Ukraine and Eastern European countries.

Understanding the strategic need for transformation to increase the level of sustainability in the agri-food supply of Ukraine and EU countries (Szaryszová et al., 2023) has thoroughly demonstrated the feasibility of targeted state support for agricultural producers who implement sustainable business development models in their management practices.

Notwithstanding the comprehensive measures undertaken by the governments of the majority of developed countries in recent years and notable advancements in attaining global food security, the global hunger issue remains unresolved. P. Vatsa and D. Miljkovic (2022) identify the high degree of dependence of EU countries on imported agricultural raw materials as the primary factor contributing to this situation. The World Bank and M. Fazle Rabbi et al. (2023), X.-Y. Zhou et al. (2023) and F. Lin et al. (2023) identify the war between Ukraine and the Russian Federation as a significant challenge. S. Bhutani & J. Wheatley (2020) highlight the potential risks and threats to agriculture posed by global climate change. The solution to these problematic aspects necessitates a joint international approach, efforts, and solutions, as well as the optimal utilisation of the available agri-food potential, with due consideration of the priorities of preserving natural resources and the environment. Ukraine is a significant player in the global food market and possesses considerable reserves that can be leveraged to address global food insecurity. However, the exclusive condition for their future utilisation is to enhance the sustainability of the country's agricultural and agri-food development.

The purpose of the article. The article is intended to assess the current state of food security in Ukraine in the context of the strategic need to achieve the goals and priorities of sustainable development of the agri-food sector. The main objectives of the research are as follows:

1. To assess the actual level of food security of Ukraine in the global dimension.

2. to analyse the actual state of food security in the country in the regional context.

3. to substantiate the mechanism of ensuring food security on the basis of sustainable development.

3. Methodology

The research employed a range of economic research methods, including the monographic method, which involved processing scientific sources and reviewing thematic literature; scientific abstraction and generalization, which was used to identify critical problematic aspects of ensuring food security in the context of the trilemma of sustainable development; the abstract-logical method, which was utilized to substantiate the mechanism of ensuring food security based on the principles of sustainable development and to formulate conclusions based on the conducted research; and index methods of analysis, which were employed to assess the current state of food security in Ukraine and to analyze the level of food affordability on a global scale. The results of the regional assessment of the actual state of food security were obtained through the application of the cluster analysis method.

4. Results

Food security at all levels of its provision and management is determined by three main criteria: 1) physical availability of food (meeting the physiological needs of the entire population while creating sufficient food reserves); 2) economic availability of food (free access to the necessary amount of food for the least financially secure segments of the population); 3) safety, quality and cost of food; 4) stability (What is Food Security?, 2023).

The physical availability of food is mediated by its economic affordability, which manifests itself at different stages of the food supply chain. Prices are of paramount importance at all stages of food production and consumption. They are a crucial condition and incentive (disincentive) for agricultural producers and food industry enterprises that determine the potential for food availability for the population. The price factor determines the economic affordability of food for the population, the degree of benefit and satisfaction of business interests, the ability to increase the production potential of the agri-food system, and the efficiency of food distribution systems and chains. Food prices have a significant impact on the socio-economic stability of countries, regions, and the global economy, and have significant consequences for society as a whole.

One of the key barometers of the global food market, and thus the state of global food security, is the price index determined by the Food and Agriculture Organisation of the United Nations. The Integrated Food Price Index consists of five main sub-indices:

1. Grain price index.

2. Price index for oil products and oils (sunflower, palm, soybean).

3. Dairy price index.

4. Price index for meat products and meat.

5. Sugar price index.

According to FAO, the global food price index has increased by 34.8 points over the past six years. At the same time, the price indices for cereals increased the most significantly – by 52.3 points (Figure 1).

The Global Food Security Index (2022), calculated by the global analytical agency The Economist, is an integral indicator of the state of food security in countries around the world. The rating considers four critical criteria: economic availability of food products, economic availability of food, its quality and safety, and stability and adaptation. In 2022, countries such as Finland, Ireland, Norway, France, and the Netherlands were identified as having the highest level of food security (Figure 2).

Ukraine has a strong natural and economic potential to ensure its strategic food security and participate in international projects that meet the global Sustainable Development Goal 2 Zero Hunger worldwide. The analysis of the country's food security showed that the population is fully provided with such foods as oil – 104.6%, potatoes – 106.8%, vegetables and melons – 103%. At the same time, over the past twenty years, problematic aspects have been observed in the self-sufficiency of the Ukrainian population in dairy products (53%), meat and meat products (66.3%), fish products (66%), and fruits, berries and grapes (65.6%) (Balances and consumption of basic food products by the population of Ukraine, 2022). The issue of quality, safety and environmental friendliness of food products produced by agriculture also needs to be reviewed. According to actual data, the share of the area treated with pesticides in Ukraine is 89.5% and has been growing significantly in recent years; the share of organic farming is no more than 9%, and the amount of mineral fertiliser applied per unit area is constantly increasing and amounts to over 134 kg (Agriculture of Ukraine, 2022).

The regional section of the analysis of the current state of food security in Ukraine, conducted using cluster analysis, demonstrated a significant differentiation of administrative-territorial regions of Ukraine by the integral indicator of food self-sufficiency. The level of self-sufficiency of the country's regions and oblasts equal to 100% was taken as the criterion of optimality.

The results showed that Luhansk, Mykolaiv, Donetsk, Odesa and Zaporizhzhia oblasts are in the risk group according to this food security criterion (Figure 3). However, not everything is so bleak,

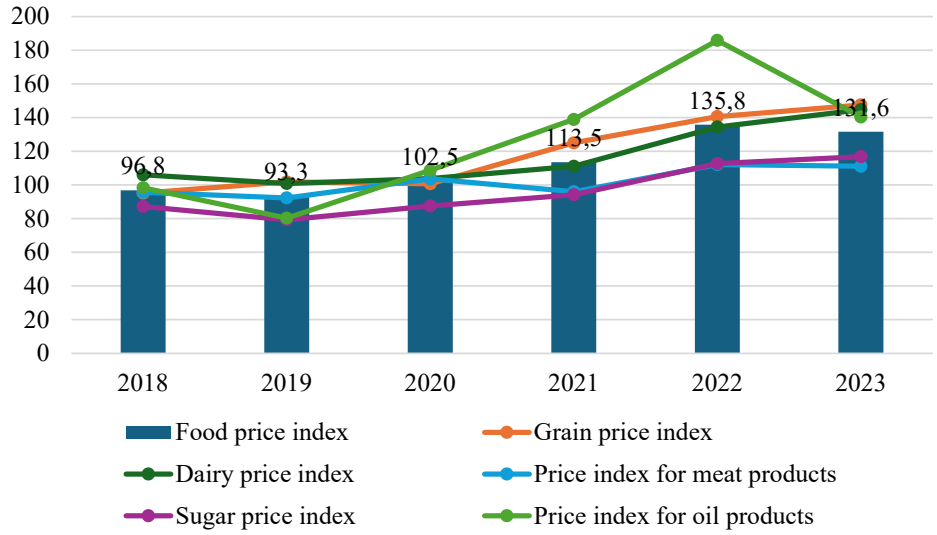

Figure 1. Global food price indices worldwide
Source: compiled by the authors based on data from (FAOSTAT)

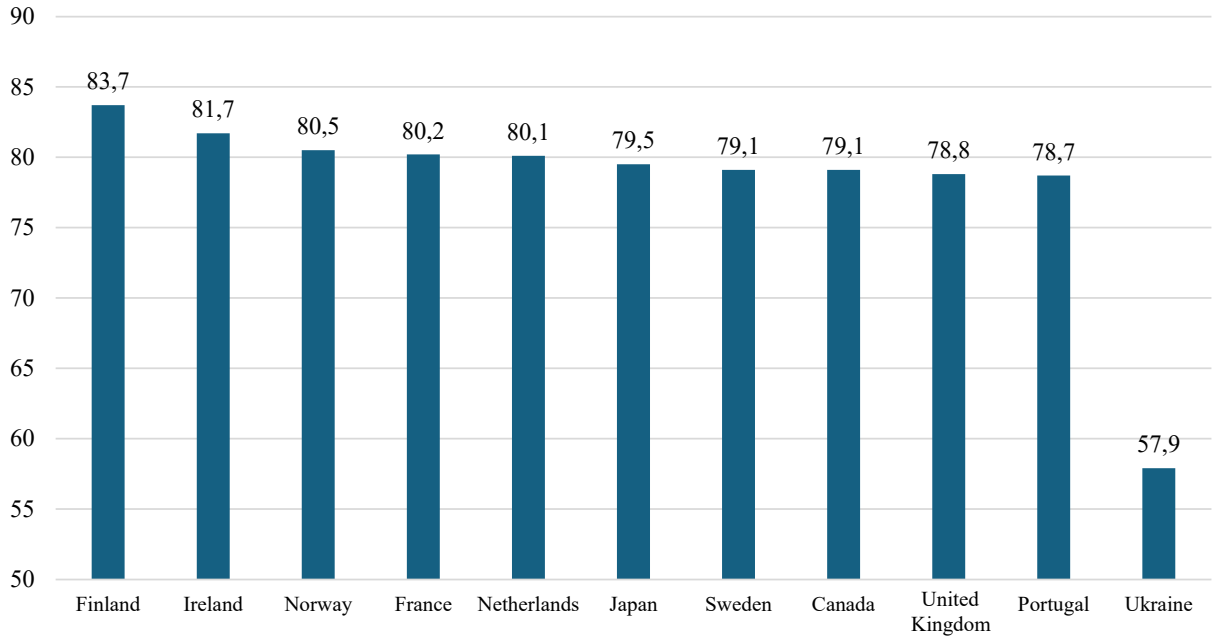

Figure 2. Global Food Security Index rating, 2022
Source: compiled by the authors based on data from (Global Food Security Index 2022)

as the highest level of food security is observed in Vinnytsia, Volhynia, Zhytomyr, Poltava, Rivne, Ternopil and Khmelnytskyi oblasts, which gives a ray of hope for the overall food security picture.

The research has shown that the current mechanism for ensuring food security in Ukraine is characterised by a significant number of complex problematic aspects. Overcoming these problems requires collective efforts of all stakeholders, including politicians, agricultural experts, scientists and other stakeholders. Solutions should be aimed at increasing the sustainability of agri-food production and consumption, rural areas and the national economy as a whole. The key problematic issues in the country's agri-food sector include the following:

1) From an economic perspective, the prevailing traditional linear models of agricultural production in management practice have resulted in a depletion of resource potential, loss of biodiversity, and a decline in the strategic competitiveness of agri-food products due to the high level of chemical production. Furthermore, the duration of the military conflict in the country has imposed limitations on the logistics chains of supply and implementation. Additionally, the financial and credit policy of the national agri-food market is characterised by instability,

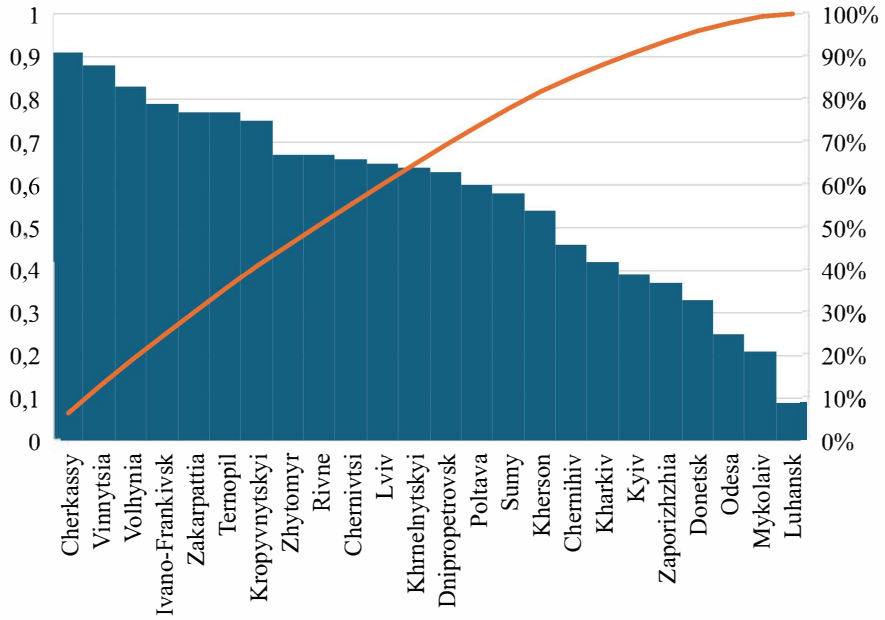

Figure 3. The value of the integral indicator of actual food self-sufficiency of the oblasts of Ukraine (2021)
Source: authors' own calculations

and there is a lack of transparency in economic operations. The agricultural market is monopolised by extensive agricultural holdings, and their interests are represented through lobbying in state administration structures.

2) In the social sphere, the low income of a significant proportion of the country's population, the high proportion of food expenditure in the structure of consumer spending by households, the existence of significant inclusive gaps in the living conditions of the population in urban and rural areas, the lack of inclusiveness and equality of economic conditions for agricultural producers, the decline of the social infrastructure of rural areas, the loss of rural labour potential and the worsening of socio-demographic problems, and the aggravation of inequality among certain strata of the country's population, along with problems of inequality in the distribution of national wealth, are all significant issues.

3) From an ecological standpoint, the following issues require attention: the depletion of agricultural soils and the loss of their fertility; the loss of biodiversity in agriculture; one of the highest levels of criminalisation of agricultural production in Europe; the resource intensity of agricultural production; the aggravation of the problem of waste accumulation; uncontrolled CO2 emissions; low rates of eco-taxes in comparison with the practice of countries in the EU; a lack of permanent and systematic monitoring of the state of the natural environment and natural and biological resources; and the withdrawal of a significant share of land from agricultural turnover as a result of hostilities and contamination by war substances.

The existence of these problems is exacerbated by the shortcomings of the current management system of the agri-food sector and the low level of awareness and social responsibility of a large part of business and society. In order to solve the existing problems in Ukraine, a strategy of sustainable development for the period until 2030 (Strategy of Sustainable Development of Ukraine until 2030, 2018) was adopted in 2021, the main goal of which is to ensure innovative economic growth on the basis of sustainable development with a focus on climate neutrality. The Strategy delineates the principal avenues for attaining the planned objectives of sustainable development, which pertain to ensuring the country's food security in terms of environmental protection, guaranteeing the production and export of safe and healthy agricultural and food products, stimulating the development of livestock industries and supporting the production of high-margin types of food. However, the financial and management component of the implementation mechanism of this Strategy remains problematic, which significantly impedes its effectiveness in practice.

A fundamental problem on the path of transformational changes in Ukraine's agri-food economy towards sustainable development is the low level of social responsibility of producers, consumers and society. In achieving food security, this is accumulated in the problems of irrational use of the country's natural and biological resources, loss of biodiversity, environmental pollution, increased carbon emissions, traditionally high level of criminalisation of agriculture, and significant amounts of food waste. According to the

authors, social responsibility should become a central element of the mechanism for ensuring the country's food security on the basis of sustainable development and the main motivator for increasing the level of sustainability of the national agri-food sector (Figure 4).

Ensuring Ukraine's food security on the basis of sustainable development includes a number of strategic measures, the implementation of which requires time, significant investments and increased social responsibility of all participants in the national agri-food system. Traditionally, the need for additional financial resources has been an acute problem for achieving the country's strategic goals in agriculture. Transformational changes in the agri-food system should be implemented in the context of the principles of sustainable development, green agriculture and inclusive opportunities for its participants. The financial basis for ensuring long-term sustainable food security should be socially responsible investments that can be attracted in the shortest possible time using digital tools and technologies. Political stability and an end to the military conflict in the country should be a prerequisite for attracting them. At the same time, the state should provide systematic institutional support for sustainable investment, stabilise the investment climate and protect investors' interests. Priority issues for attracting sustainable agri-food investment should include rational land use and restoration of the natural potential of agricultural land, reducing the criminalisation of agri-food production, levelling inclusive gaps between the quality of life in rural and urban areas, and financial support for agri-ecological innovations.

5. Conclusions

Food security and its maintenance under all conditions and socio-economic circumstances remain important and urgent issues at both the global and national levels. Today, the problem of hunger is most acute in the countries of Central and Eastern Africa, South Asia and the Caribbean. The global solution to this problem is being implemented within the framework of the Sustainable Development Goals,

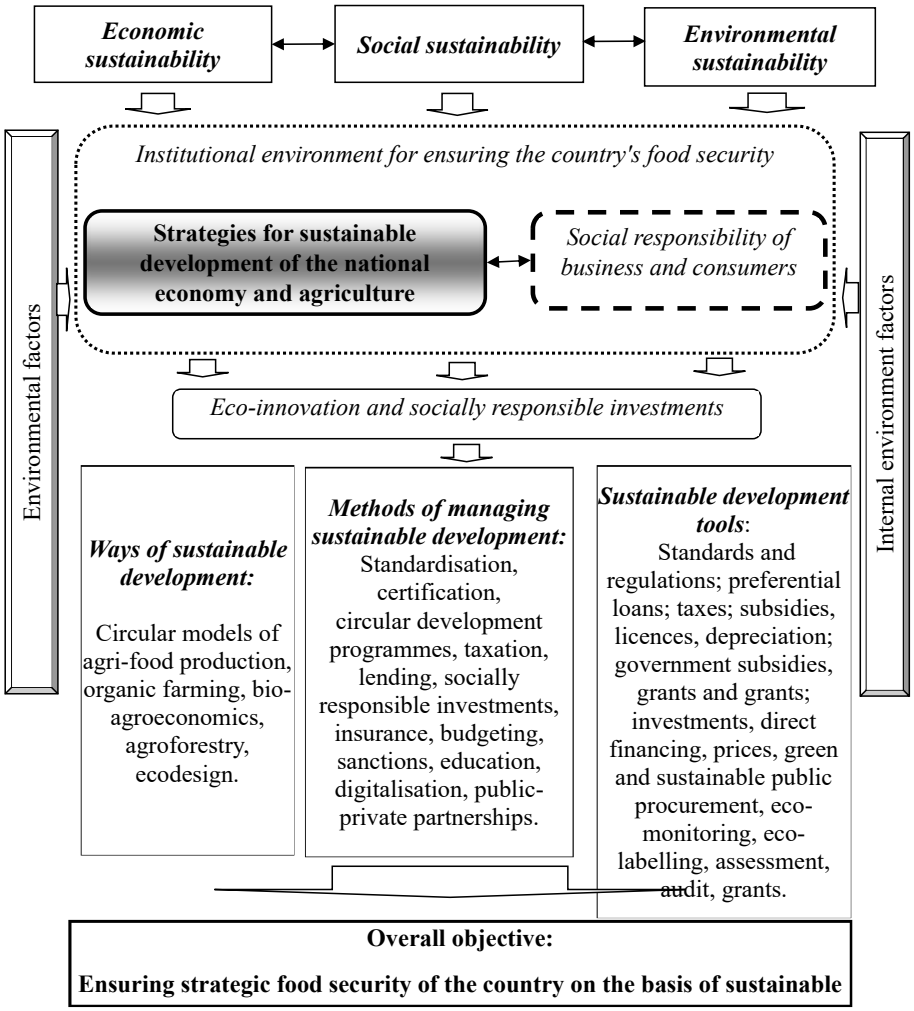

Figure 4. The mechanism for ensuring food security on the basis of sustainable development
Source: authors' development

in particular Goal 2: Zero Hunger (17th SDG). According to this approach, the achievement of food sovereignty of the state and ensuring global and national food security should be based on the economic, social and environmental principles of sustainable development.

An important characteristic of food security is the affordability of food for the population. According to the study, in 2018-2023, the aggregate index of food affordability had a clear upward trend and amounted to 131.6%. Among the types of food, the highest price growth rates were for cereal products.

Ukraine has a strong potential to ensure its own food security and participate in global efforts to end hunger in the world. In the GFSI global ranking in 2022, Ukraine ranked 71st with a score of 57.9 and a five-point improvement over the previous four years. At the same time, Ukraine fully ensures its food security for such foods as oil, potatoes, vegetables and melons. More needs to be done to ensure that the population has enough meat and meat products, dairy products, fish products, fruit, berries and grapes. Regionally, the lowest levels of food security were recorded in Luhansk, Mykolaiv, Donetsk, Odesa and Zaporizhzhia oblasts. The highest level of food security was achieved in Vinnytsia, Volhynia, Zhytomyr, Poltava, Rivne, Ternopil and Khmelnytskyi oblasts.

The results of the study showed that the country's food security is currently characterised by complex trends and problematic aspects in all three areas of sustainable development of the agri-food sector. To overcome the identified difficulties, it is necessary to improve the mechanism of ensuring food security on the basis of sustainable development, the main elements of which are strategic initiatives by the state and social responsibility of business and food consumers.

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