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FORMATION OF FOOD SUPPLY OF THE AGRARIAN SECTOR OF UKRAINE ON THE BASIS OF RESTORATION OF THE DEVELOPMENT OF RURAL AREAS

Formación del suministro alimentario del sector agrario de Ucrania sobre la base de la restauración del desarrollo de las zonas rurales

Formação do fornecimento alimentário do setor agrário de Ucrânia sobre a base da restauração do desenvolvimento das zonas rurais

Kateryna M. Didur
Dnipro State Agrarian and Economic University
Dnipro, Ucrania
ORCID 0000-0002-8489-0308
katerynadidur@ukr.net

Halyna O. Kundieieva
National University of Food Technologies
Kiev, Ucrania
ORCID 0000-0003-0513-8263
halyna.kundieieva@outlook.com

Ganna V. Ortina
Dmytro Motornyi Tavria State Agrotechnological University
Zaporiyia, Ucrania
ORCID 0000-0003-0266-740X
gannaortina@proton.me

Tetiana A. Pikhniak
Leonid Yuzkov Khmelnytskyi University of Management and Law
Jmelnitsky, Ucrania
ORCID 0000-0002-3301-3495
t.pikhniak@hotmail.com

Anna V. Revkova
Vinnytsia National Agrarian University
Vinnytsia, Ucrania
ORCID 0000-0003-2622-5681
revkova_anna@protonmail.com

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ABSTRACT

This article is relevant because it examines the food supply system in the agrarian sector of Ukraine, considering the socio-economic component of rural development and the integration of sustainable agricultural systems. The research aims to explore and propose a functional model for the food supply of the agrarian sector in Ukraine. The research involved analysing the differentiation in food costs among different social groups of the population. The findings of the study present a hierarchical five-dimensional framework for the formation of the agrarian sector's food supply. The article provides insights into the assessment of food supply stability, food costs, food independence, economic accessibility, rural household trends, and strategies for rural development in Ukraine. It can be useful for policymakers, agricultural economists, researchers, and organizations involved in rural development, agricultural planning, and food security.

KEYWORDS
United territorial community, household, socio-economic component, sustainable system, economic accessibility.

RESUMEN

Examinamos el sistema de suministro de alimentos en el sector agrario de Ucrania, teniendo en cuenta el componente socioeconómico del desarrollo rural y la integración de sistemas agrícolas sostenibles, a fin de explorar y proponer un modelo funcional para el abastecimiento alimentario del sector agrario en Ucrania. Durante la investigación, se llevó a cabo la diferenciación del coste de los alimentos por grupos sociales de la población, que se rastreó mediante el coste de los alimentos del 20% de los hogares con los ingresos más altos y el coste de los alimentos del 20% de los hogares con los ingresos más bajos. Las conclusiones del estudio presentan un marco jerárquico de cinco dimensiones para la formación de la oferta alimentaria del sector agrario. El artículo aporta ideas para evaluar la estabilidad del suministro de alimentos, el coste de los alimentos, la independencia alimentaria, la accesibilidad económica, las tendencias de los hogares rurales y las estrategias de desarrollo rural en Ucrania. Puede ser útil para responsables políticos, economistas agrarios, investigadores y organizaciones dedicadas al desarrollo rural, la planificación agraria y la seguridad alimentaria.

PALABRAS CLAVE
Comunidad territorial unida, hogar, componente socioeconómico, sistema sostenible, accesibilidad económica.

RESUMO

Examinamos el sistema de suministro de alimentos no setor agrário de Ucrânia, tendo em conta o componente socioeconômico do desenvolvimento rural e a integração de sistemas agrícolas sustentáveis, com o fim de explorar e propor un modelo funcional para o abastecimento alimentário do setor agrário em Ucrânia. Durante la investigação, efetuou-se a diferenção do custo dos alimentos por grupos sociais da população, que foi rastreada mediante o custe dos alimentos do 20% dos lares com os ingressos mais altos e o custo dos alimentos do 20% dos lares com os ingressos mais baixos. As conclusões do estudo apresentam um marco hierárquico de cinco dimensões para a formação da oferta alimentária do setor agrário. O artigo aporta idéias para avaliar a estabilidade do suministro de alimentos, o custe dos alimentos, a independência alimentária, a acessibilidade econômica, as tendências dos lares rurais e as estratégias de desenvolvimento rural em Ucrânia. Pode ser útil para responsáveis políticos, economistas agrários, investigadores e organizações dedicadas ao desenvolviemento rural, a planificação agrária e a segurança alimentária.

PALAVRAS-CHAVE
Comunidade territorial unida, lar, componente socioeconômico, sistema sustentável, acessibilidade econômica.

Introduction

Before a full-scale war broke out in Ukraine in 2022, the country experienced significant military events back in 2014. In 2014, Russia annexed Crimea, which led to an international crisis and increased tensions in the region. Beyond the annexation of Crimea, a war broke out in eastern Ukraine, where Russian-backed militants opposed Ukrainian forces. This conflict resulted in significant deaths and destruction and was one of the causes of the deep crisis in Ukraine. In 2014, Ukraine experienced significant political and economic turmoil, which had a notable effect on the agrarian sector. The annexation of Crimea by Russia and the conflict in Eastern Ukraine disrupted agricultural operations and trade. Agricultural exports faced challenges due to trade restrictions and market access issues. Additionally, the devaluation of the Ukrainian hryvnia affected input costs and access to financing for farmers.

On the other hand, in 2022, Ukraine has made efforts to stabilize its agrarian sector and enhance its resilience. The country has been working on expanding its agricultural exports to global markets, diversifying its product range, and improving infrastructure and logistics. Investments in technology and modernization have increased agricultural productivity. Moreover, Ukraine has been focusing on sustainable agriculture practices and environmental conservation. While challenges persist in both years, such as weather-related risks and market fluctuations, the agrarian sector in 2022 benefits from improved policies, infrastructure, and a more diversified approach to international markets compared to the situation in 2014.

In 2014, Ukraine experienced a significant increase in agricultural production and food supply in the pre-war period. However, the onset of war led to environmental factors causing the degradation of ecosystems, loss of biodiversity, decline in fish stocks, reduction of forest coverage, and increased emissions of heavy chemicals (Honchar et al., 2022). These factors resulted in population migration and posed an unprecedented threat, restricting rural communities' access to land and resources. Consequently, the country faced numerous crises and conflicts, largely stemming from the ongoing hostilities. The loss of food security in Ukraine's agricultural sector had global implications, as the country ranked among the top 10 grain producers and had a robust agro-processing industry. This decline disrupted the supply chain, reduced economic productivity, and affected consumers' access to food products.

Overcoming the complex challenges facing the country requires transformational actions that embrace the principles of sustainability and the elimination of the consequences of martial law, which, since the beginning of the full-scale intervention of the aggressor country, have caused a break in the food chain between rural areas, with rational nature use and food security subjects in the regions of the state (Vinichenko et al., 2020). These issues were neglected in the state policy of food supply, in particular, regarding the revival of rural communities, the creation of incentives for the inclusive growth of agricultural production volumes, the satisfaction of the population's needs in food products, the provision of processing industries with agro-raw materials, and the formation of the state's export potential (Iskakova et al., 2022). In today's context, the agricultural sector's food potential necessitates the implementation of effective measures to promote the intensive development of rural areas, enhance the living standards of rural populations, and improve overall demographics. However, without adequate state support, small-scale producers face instability and limited influence in diversifying rural development. This is due to inconsistent and irregular local go-

vernance, which hinders efforts to address disparities in agricultural production and achieve balance. Therefore, the crisis economic situation, the increase in depressed rural areas, environmental and radiation pollution of rural areas, degradation processes—all this creates a threat to the country's food supply (Kaimbayeva et al., 2021; Musiy et al., 2017; Turmagambetova et al., 2017). The need to modernize and reorganize state policy in the process of developing rural areas is caused by the modern requirements of the needs of the rural population for a better life and the restoration of the processes of effective use of existing and potential opportunities of rural communities, strengthening their competitive advantages. In these conditions, the issue of spatial destination of rural areas and determination of priority directions for food self-sufficiency of households is important.

In this context, the article by Shebanina et al. (2018) focus on the investment aspect of the meat sector and its relationship to food security in Ukraine. The researchers provide insights into the investment landscape of the meat sector, policy implications, and recommendations for promoting investment in the context of food security. The authors also examine the role of investments in the meat sector and their impact on ensuring food security within the country. They explore the trends, patterns, and dynamics of investments in the meat industry, considering factors such as capital inflows, investment projects, and their effects on production capacity and supply chains. The article highlights the interdependencies between food security, economic development, social stability, and geopolitical considerations. The objectives, history, and evolution of the Common Agricultural Policy, its role in ensuring the stability and sustainability of the agricultural sector in the European Union are presented in the corresponding study (EPRS, 2018). It delves into the key components of the Common Agricultural Policy, including agricultural subsidies, market interventions, rural development programs, and environmental measures. Furthermore, the article examines the challenges and criticisms associated with the Common Agricultural Policy, such as concerns about the equitable distribution of subsidies, environmental impact, and the need to adapt to changing agricultural practices and societal demands.

Thus, the aim of this research is the development of a functional model of food supply of the agrarian sector of the economy, which takes into account the socio-economic component of reproduction of the development of rural areas, provided that sustainable agricultural systems are used, which are integrated in the food chain of food self-sufficiency. In order to address the overarching goal of this research on the functional model of food supply in the agrarian sector, the following specific research questions or objectives emerge. Firstly, how can the socio-economic components of reproduction be effectively integrated into the agrarian sector's food supply model, particularly in the context of rural development? Secondly, what are the key characteristics of sustainable agricultural systems that best contribute to food self-sufficiency? Thirdly, how can these sustainable agricultural systems be effectively embedded within the broader food chain to ensure continuity and resilience? And lastly, how do different factors within the food supply model impact the economic viability and social wellbeing of rural territorial communities?

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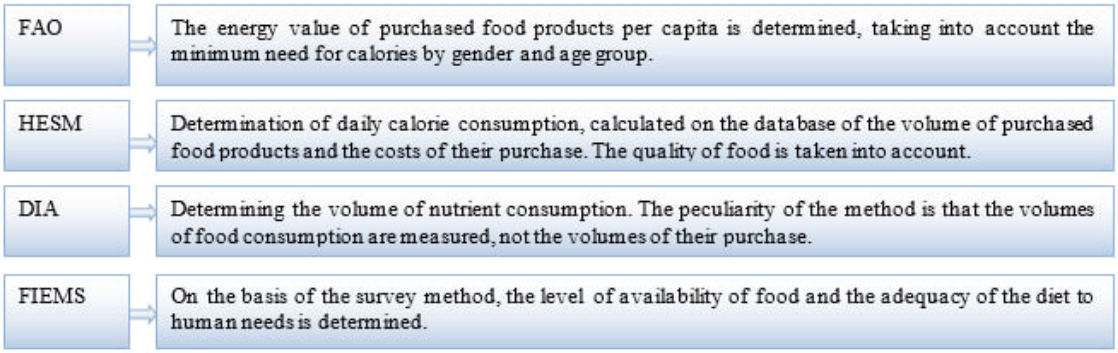
Materials and methods

The study employed analytical and comparative approaches, including statistical analysis, econometric modelling, and qualitative research, as its methodology. Common methods for calculating the agricultural sector's food supply index based on rural development include FAO, peasant household expenditure surveys (HESM), food quality assessment (DIA), and expert evaluation of food supply threats (FIEMS) (Figure 1).

Figure 1. Grouping of methods for evaluating the food supply index of the agrarian sector of the economy

Figura 1. Agrupación de métodos de evaluación del índice de abastecimiento alimentario del sector agrario de la economía



Source/Fuente: FAO & WHO (2015)

To establish a comprehensive set of indicators for the food supply system in the agrarian sector, it is recommended to allocate them based on a structural modelling methodology that considers the input resource parameters of rural areas. These parameters are transformed into output results, specifically the level of food supply, which is represented as an integrated indicator. To assess the resource potential and ensure a stable level of food supply in the agrarian sector, it is essential to calculate the normalized indicator of the entrepreneurial potential of rural territorial communities. Rural territorial communities refer to specific administrative entities formed by the voluntary unification of rural areas, often encompassing multiple villages or settlements, to collectively manage local affairs and resources. The average size and population of an rural territorial community can vary significantly based on the region and specific local circumstances. Typically, though, they would include a few thousand to tens of thousands of inhabitants, spread over several settlements. In terms of administrative function, they do have significant roles. They possess local self-government rights, meaning they can independently manage certain local issues, budgets, and development initiatives without always seeking approval from higher regional or national administrative bodies. Other relevant details include the fact that rural territorial communities can receive direct funding from the national budget, which provides them with greater financial autonomy and capacity to implement local projects. They also often engage in cooperative efforts, sharing resources and expertise to tackle challenges that affect the broader community. This indicator can be determined using a specific formula:

$$II = \frac{1}{n} \sum_{i=1}^{n} K_{ni} \omega_i , \qquad (1)$$

Where, K_{ni} – the normalized coefficient of the *i-th* indicator of the entrepreneurial potential of rural communities; w_i – weight assessment of the *i-th* indicator; n – the number of indicators characterizing the entrepreneurial potential of rural communities.

$$K_{ni} = \frac{I_i^+}{I_{\max_i}}, \quad \text{or} \quad K_{ni} = \frac{I_i^-}{I_{\min_i}}, \tag{2}$$

Where, I_i^+ – the *i-th* indicator, the increase of which leads to an increase in the entrepreneurial potential of rural territorial communities; I_i^- – the *i-th* indicator, the increase of which leads to a decrease in its level; $I_{\max_i}$ and $I_{\min_i}$ – the maximum and minimum value of the *i-th* indicator within the investigated volume of rural territorial communities.

The use of this methodology will allow: first, to assess the strategic resource potential of rural areas at the regional level and to form a food base provided with a real food chain in the agricultural product supply system; secondly, to develop local strategies, based on the existing potential opportunities for their implementation with the participation of the entrepreneurship of rural territorial communities.

The process of ensuring a continuous food supply in the agrarian sector relies on two types of factors: direct influence factors, which directly participate in transforming input resources into output results, and indirect influence factors, which impact the efficiency of this transformation. The formation of a safe food supply level involves various processes, such as food production (agricultural production and processing), distribution (within rural areas and the domestic food market), and consumption. The efficiency of agricultural producers is also a crucial factor to consider among the direct influence factors. Quantitatively, indicators of a safe and stable food supply level serve as key metrics.

Results

Transformational processes in the agrarian sector of Ukraine's economy, caused by crisis phenomena and associated with the full-scale military invasion of the aggressor country on the territory of the state, provoked a threatening trend of decline in the level of food supply, which in 2022 became even more critical in relation to the level of 2021. It is noted that the stable conditions of Ukraine's food security are formed on the basis of interaction with agrifood production in rural areas, on which the state of providing the population with high-quality food products largely depends. Despite the sufficient number of calories consumed per capita, according to the structure of the consumer basket, food supply with agricultural products in Ukraine is deteriorating. While the amount of meat and milk decreases, grain products increase, causing a shortage of proteins, vitamins, macro- and microelements of animal origin, which leads to the so-called "hidden hunger". In addition, there is a negative trend of food quality deterioration.

The recommended minimum daily energy intake for individuals in Ukraine is 2500 kcal, with 55% of the diet consisting of animal products. In 2021, the average daily energy intake reached 2691 kcal, surpassing the limit by 7.6%. The distribution of food consumption was as follows: animal products accounted for 29.7% of the daily ration, while plant products constituted 70.3%. During the period 2000-2022, the caloric index of the country's population's

diet was higher than the limit, the maximum decrease occurred in 2022 – up to 2661 kcal (by +6.4% more than the limit), the highest indicator was in 2000 – 3597 kcal (by +43.9%). The share of consumption of products of animal origin in 2022 was lower than the established norm by 55% of the daily diet, and varied within 23.0-29.7%. According to FAO data, the average daily caloric content of the diet in the EU countries varies within 3400-3500 kcal, in the USA – 3900 kcal, and the share of animal products in the diet of these countries, as well as in Ukraine, is on average 29-30% (FAO and WHO, 2015).

Table 1 presents quantitative indicators of an approximate set of food products and food raw materials, which determined the actual and sufficient level of their consumption by the population of Ukraine, on average per person in 2020-2022. Thus, in 2022, the average per capita consumption of food products decreased in almost all food groups, in particular, the annual consumption of meat decreased by 55% (beef and poultry, especially low-fat varieties of meat), milk – by 51%, fish – by 46%, eggs – by 16%, vegetables – by 8%, fruits – by 55%, sugar – by 36%. At the same time, the consumption of bread and bakery products, as well as potatoes, increased by 9% and 7% respectively. It should be noted that by 2022, compared to the level of 2012 in Ukraine, the average population consumption of products important for healthy nutrition per person had a tendency to increase: fruits – by 2 times, eggs by 70%, times, eggs by 63%, vegetables by 62%, fish by 49%. In turn, the consumption of bakery products and sugar decreased by 22% respectively.

Table 1. Actual annual food consumption for 2019-2021 in Ukraine, kg/person
Tabla 1. Consumo anual real de alimentos para 2019-2021 en Ucrania, kg/persona

Type of food	Norm	Actual consumption			Indicator of sufficiency of consumption		
		2020	2021	2022	2020	2021	2022
Bread and bread products	101	97.6	99.5	109.8	0.97	0.99	1.09
Meat and meat products	80	53.6	52.8	40.7	0.67	0.66	0.45
Beef		7.7	7.5	6.5			
Veal		19	19.4	14.2			
Poultry meat		26	25	20.3			
Milk and milk products	380	200	197.7	187.5	0.53	0.52	0.49
Fish and fish products	20	12.5	11.8	10.8	0.63	0.59	0.54
Eggs (pcs.)	290	282	275	243	0.97	0.95	0.84
Vegetables and melons	161	164.7	163.9	149.7	1.02	1.02	0.92
Fruits, berries, and grapes	90	58.7	57.8	40.8	0.65	0.64	0.45
Potatoes	124	135.7	139.4	133.4	1.09	1.12	1.07
Sugar	38	28.8	29.8	24.4	0.76	0.78	0.64
Vegetable oil	13	12	11.9	9.7	0.92	0.92	0.74

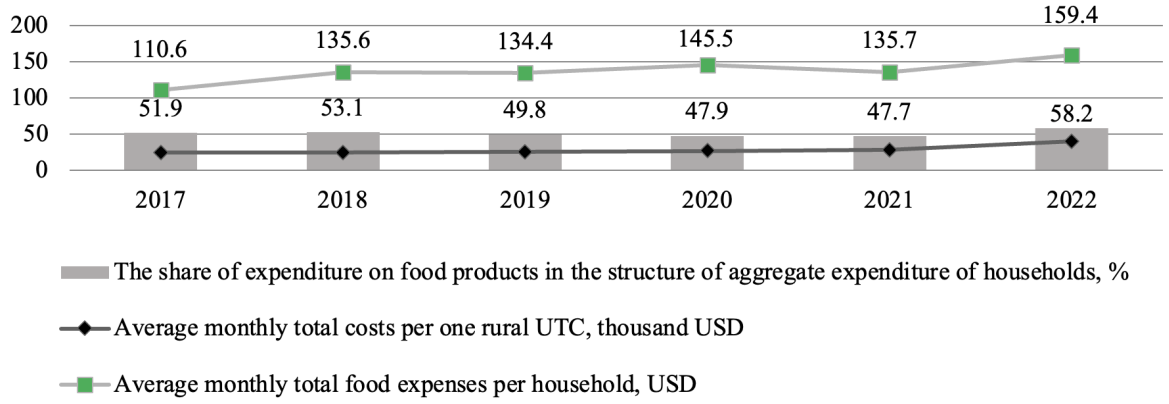
Source/fuente: FAO and WHO (2015), and State Statistics Service of Ukraine (2023).

Grain production in Ukraine until 2022 had a steady upward trend. The total amount of grain produced in the country during the period 2017-2021 increased by 2.5 times. It should be noted that before the war (2017-2021) in Ukraine, the area of agricultural land under the cultivation of subjects of the rural territorial communities, including the area of leased plots of land, which were under the cultivation of subjects of the agrifood sector and which formed the basis of the land and resource the potential of rural areas increased by 2.6%. However, due to the occupation of the Southern regions of Ukraine by the aggressor country, in 2022 their share decreased in relation to the level of 2021 by 29% (FAO and WHO, 2015; State Statistics Service of Ukraine, 2023).

In Ukraine, the production of all grain and leguminous crops in rural territorial communities in 2022 amounted to 56.6 million tons, which is 55% less than in 2021 (125.7 million tons), the production of grain crops decreased by 37% (53.9 million tons). Along with this, in order to create a safe level of food security, the maximum export volumes of grain crops (wheat) are agreed annually between the Ministry of Economy and participants of the grain market. According to the results of 2022, the country became the ninth largest producer of wheat in terms of 20.5 million tons, which is a third lower than in 2021 due to the full-scale military aggression unleashed by the Russian Federation. Thus, the volume of beef production in 2017-2022 decreased by 36.7%, pork – by 45.2%, poultry – by 17.1%, eggs – by 29.4%, milk – by 26%, honey – by 72.6%. Only during the year of the full-scale war in Ukraine, the resource component of the rural territorial communities in the field of animal husbandry, in relation to the level of 2021, suffered large losses. Products were not received in the following proportion: beef meat – by 25.9%, pork – by 43.5%, poultry – by 33.2%, eggs – by 44.1%, milk – by 6.3%, honey – 62.3%. The ongoing trend of rising food costs as a proportion of total consumption expenses reflects the declining economic accessibility of food products. This applies to both rural households in their permanent residential areas and households residing in urbanized settlements outside of occupied territories. This trend worsens the standard of living in the country (Figure 2).

Figure 2. Economic accessibility of rural joint territorial communities to the formation of food security of Ukrainian households in 2017-2022

Figura 2. Accesibilidad económica de las comunidades territoriales rurales conjuntas a la formación de la seguridad alimentaria de los hogares ucranianos en 2017-2022



Source/fuente: FAO and WHO (2015), State Statistics Service of Ukraine (2023).

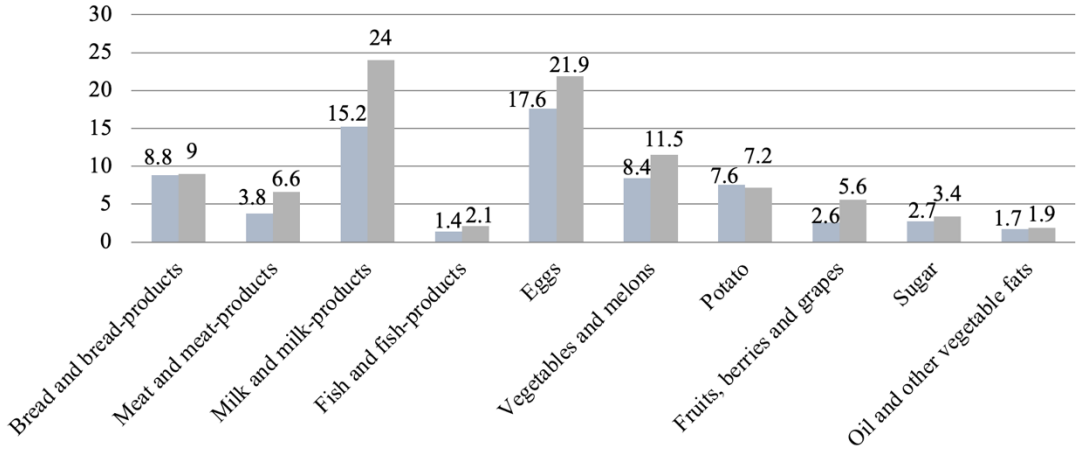
It should be noted that the average monthly total costs for one rural territorial communities producing agrifood products to meet household food needs for 2017-2022 increased by 62.9%. During one year of the full-scale military conflict on the territory of Ukraine, the volume of expenditures of the rural territorial communities for the production of agrifood products increased by 41%. Such a critical trend affected the structure of total household expenses in 2022 – food expenses amounted to 58.2%, and compared to 2021, they increased 1.2 times. In European countries, this indicator ranges from 10% to 15%.

Despite the fact that the conditions for safe food provision are formally met, food expenses constitute a significant share of household expenses, which indicates the low standard of living of the population and causes a threat to food security in the regions and the whole country. In 2022, the average monthly consumer aggregate expenditure of households on food was 159.4 USD, on food outside the home – 180.42 USD. In relation to 2021, the average monthly expenditure of households on food and agricultural products increased by 17.5% and there is no tendency to decrease them. Meat and meat products account for the largest portion, constituting 24%, of consumer expenditures on food, followed by bread and bread products as well as milk and dairy products, each accounting for 15% of the total. At the same time, in the EU countries, the share of household expenses for the purchase of food products is on average 13.1% in the total structure of expenses (the minimum share of 7.8% is in Luxembourg, the maximum share of 26.2% in Romania).

In 2022, the monthly food expenditure for the top 20% of households with the highest income (highest quintile) was $440.4, while for the bottom 20% of households with the lowest income (lowest quintile), it was $159.2. This indicates an increase in the differentiation of food costs among social groups, with a differentiation coefficient of 2.8%. The biggest differentiation in consumption within the upper and lower quintiles for 2017-2022 is preserved for products of animal origin and also in the fruit and berry food group (Figure 3).

Figure 3. Food consumption by Ukrainian households by quintile groups depending on the amount of income per person on average in 2021 (on average per month per person, kilograms in terms of the main product)

Figura 3. Consumo de alimentos de los hogares ucranianos por grupos de quintiles en función de la cuantía de los ingresos por persona de media en 2021 (de media al mes por persona, kilogramos en términos del producto principal)



Source/fuente: FAO and WHO (2015), and State Statistics Service of Ukraine (2023).

In 2021, there is a high level of differentiation of the cost of food by social groups in Ukraine: 20% of households with the highest incomes spent on food 144.9 USD per month on average, 20% of households with the lowest incomes – 89.7 USD. The coefficient of differentiation of the cost of food by social groups was high and amounted to 1.8. The biggest differentiation in consumption within the upper and lower quintiles has been observed for more than one year in a row for products of animal origin (meat, fish, milk), as well as for the fruit and berry group (in 1.7-2.2 times). Therefore, in Ukraine, even in the conditions of a crisis and a military conflict, it is necessary to increase the aggregate incomes of households on the basis of a balanced socio-economic policy of the state, to direct the regulatory levers to the prevention of excessive spending by rural self-government organizations, the differentiation of household expenses and incomes, and, accordingly, to the functionality of the integral food chain of rural territories in the food and agricultural system of the agrarian sector of the country, as important factors in the formation of a safe and stable level of food self-sufficiency in the regions.

The activation of the reproductive process in agriculture is crucial for ensuring food security in the agrarian sector of Ukraine's economy. This is particularly significant considering that approximately one-third of the country's population resides in rural areas, which have the potential to contribute to the formation of a secure food supply. However, the reproduction of rural areas in Ukraine, first of all, depends on the state support of this process by the state and by joint territorial communities. The regions with the highest rural population in Ukraine are Lviv, Zakarpattia, Odesa, Vinnytsia, and Ivano-Frankivsk, while the regions with the lowest rural population are Mykolaiv, Chernihiv, Kirovohrad, and Sumy. In terms of rural settlement, Zakarpattia, Chernivtsi, and Ivano-Frankivsk regions had the highest number of rural inhabitants in 2022, with Zakarpattia having the highest at 1368 people. An important social aspect in the development of rural areas is the overall increase or decrease in the rural population. In 2022, there was a general decrease in the rural population in Ukraine, with a reduction of 118.9 thousand people, primarily due to both natural factors (10.7 thousand) and migration (108.2 thousand), which were influenced by the occupation of the Southern regions of Ukraine.

Migration growth of rural residents was observed in Kyiv (13.7 thousand), Lviv (5.03 thousand) and Rivne (4.48 thousand) regions, while in other regions there was a decrease in rural households due to migration. In order to calculate the integral index of the reproduction of the development of rural areas, the main indicators of the socio-economic component in Ukraine and their dynamics in 2023-2026 were highlighted, which are presented in Table 2.

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Table 2. Indicators of social components of reproduction of the development of rural areas in Ukraine in 2023-2025

Tabla 2. Indicadores de los componentes sociales de la reproducción del desarrollo de las zonas rurales en Ucrania en 2023-2025

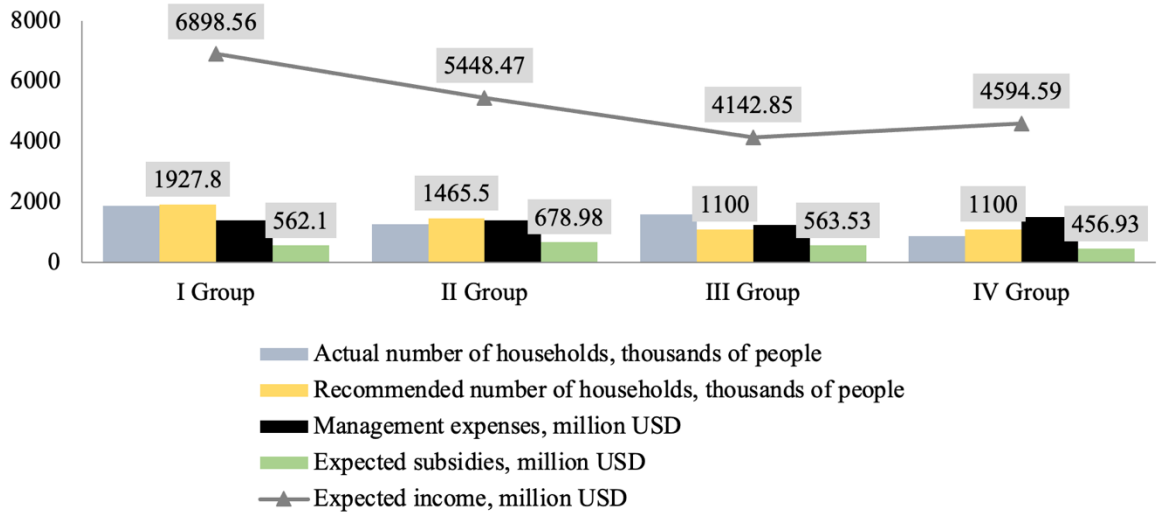
Indicators	2023	2024	2025	2026
Share of the rural population, %	30.59	30.71	30.77	30.81
Number of the rural population based on one rural community, on average people	454	459	462	464
Total increase, reduction (-) of the rural population, per thousand people	118.9	86.9	-73.3	80.6
Economically active population aged 15-70, thousand people	5604.7	5602.3	5648.7	5667.5
Level of economic activity, %	60.6	60.4	60.9	60.8
Unemployment rate, %	9.2	9.9	9.7	9.4
The number of hospital beds available per thousand individuals	4.73	4.76	4.73	4.21
Percentage of households with home internet access	27.2	30.6	38.6	40.6
Provision of living space, m2 per person	28.97	29.3	29.61	30.07
Furnished apartments in rural residential and non-residential buildings, %				
Water supply	29.8	30.6	31.5	32.3
Sewerage	26.1	26.9	27.7	28.5
Heating from individual installations	48.8	48.9	49.5	49.9
Natural gas heating	97.4	97.7	97.7	98.1

Source/fuente: FAO and WHO (2015), and State Statistics Service of Ukraine (2023).

The economic aspect of rural development can be evaluated by examining various indicators, including the extent of agricultural land development, the employment of rural entities in the agrifood sector and the formation of food supply for the agrarian economy. Other important indicators include profitability levels, the number of rural households engaged in agriculture and their income, revenue generated from agricultural product sales, gross agricultural output, and the amount of capital invested in agricultural production. As a result of the transformation of the reproductive process for the development of rural areas in Ukraine and the grouping of rural territorial communities according to the "maximization of own income" approach, their own income will increase by 0.4% (76 million USD), management expenses will not change, the volume of state subsidies will decrease by 2% (46.2 million USD). According to the chosen approach, it is recommended to reduce first of all the number of communities of the third group, since the average income per inhabitant in this group is the lowest. The expected financial results of the functioning of communities after the reorganization of their structure are shown in Figure 4.

Figure 4. Implementation of the transformational process to reproduce the development of rural territories and groups of rural local government organizations according to the approach of "maximizing own income"

Figura 4. Aplicación del proceso de transformación para reproducir el desarrollo de los territorios rurales y los grupos de organizaciones de gobiernos locales rurales según el enfoque de "maximización de los ingresos propios"



Source: own elaboration. Fuente: elaboración propia.

Thus, for the period of 2023-2026, subject to an increase in the production of meat and meat products by the rural territorial communities of Ukraine by 10%, the total amount of resources of the agrarian sector of the economy will increase by 14.4%, an increase in the consumption fund will amount to 15.5%, which will lead to an increase in the general needs of the population for this type of agricultural products to 7.1%. Accordingly, this will allow for increasing the index of food self-sufficiency of the agrarian sector from 0.65 to 0.7 respectively.

Discussion

Developing a sustainable and effective food supply system in Ukraine's agrarian sector by revitalizing rural areas and promoting their development is the subject of study of many researchers. For example, the article by Burkovska et al. (2020) focuses on modelling of social stability within the context of food safety. The relevance of this article to this research lies in the potential overlap of concepts and perspectives. The article aims to examine the functional model of food supply in the agrarian sector, taking into account the socio-economic component of rural development and the integration of sustainable agricultural systems. The article's focus on social stability and food safety can contribute to the understanding of the broader context and implications of the research on food supply formation in the agrarian sector of Ukraine.

Many researches emphasize the need for innovative approaches and advancements in food science to meet the challenges of feeding a growing population (Shukesheva et al., 2018; Tlevlessova et al., 2023). They also discusse the significance of sustainable food production methods and technologies, explores various aspects such as agricultural practices, food processing, packaging, and distribution systems that can contribute to sustainable and efficient food production (Nagovska et al., 2018; Prylipko et al., 2020). The authors emphasize the importance of ensuring food safety and quality throughout the food supply chain. They discuss the role of food science in developing and implementing safety measures, testing methods, and quality control systems to protect consumers from foodborne illnesses and ensure nutritious and safe food. These insights provide a broad overview of the key themes discussed in the article and highlight the significance of food science and technology in addressing global food issues.

In other hand, Khomiuk (2019) notes that decentralization refers to the transfer of power and decision-making authority from central government to local authorities. Understanding the implications and effects of decentralization on rural development can provide insights into the potential for local-level initiatives and governance structures to shape the formation of the food supply system. The scientist argues that examining the experiences and lessons learned from decentralization efforts in rural areas could be relevant to the research. Also, the research on the formation of food supply in the agrarian sector of Ukraine may benefit from exploring the policy implications of rural diversification and decentralization. Identifying the policy frameworks, strategies, and support mechanisms that have been effective in promoting rural development and food security in other contexts could inform recommendations for policy interventions in Ukraine.

The article by Lagodiienko and Lagodiienko (2019) focuses on conducting an empirical analysis to evaluate the effectiveness of the Free Trade Area between the European Union and Ukraine specifically in the context of the agricultural market. The study aims to assess the impact of the Free Trade Area on the agricultural market in Ukraine, examining factors such as changes in trade volumes, market competitiveness, and economic performance. The analysis involves quantitative methods and data analysis to evaluate the outcomes of the Free Trade Area and its implications for agricultural trade between Ukraine and the European Union. The relevance of this study for the research lies in its examination of the effectiveness of the Free Trade Area between the European Union and Ukraine in the agricultural sector. The authors emphasize that assessing the impact of the Free Trade Area is important as it can provide insights into the outcomes of trade agreements on the agricultural market and overall economic development. The findings of the study can inform policymakers, researchers, and stakeholders about the advantages, disadvantages, and potential areas for improvement in the context of the European Union-Ukraine Free Trade Area. Nonetheless, some aspects that may be relevant but not explicitly addressed could include social impacts, environmental sustainability, and the effects on small-scale farmers or rural communities (Uzakov et al., 2020). Additionally, the study focuses solely on the agricultural market and not consider other sectors or broader economic impacts beyond trade volumes and competitiveness. In other hand, Khomiuk (2019) presents the concept of diversification in rural development. The scientist suggests the need to promote and support a variety of economic

activities and sectors in rural areas. For instance, this can include diversification in agricultural practices, value-added products, rural tourism, and other non-agricultural activities. In the context of the research, considering diversification strategies could contribute to a more resilient and sustainable food supply system in the agrarian sector of Ukraine.

The study by Vinichenko et al. (2020) focuses on the topic of food security and its significance as a strategic priority within agrarian policy, emphasizing its role in ensuring national security of a state. The article explores the concept of food security and its various dimensions, such as availability, accessibility, affordability, and nutritional adequacy of food. It discusses the challenges and risks related to food security, both at the national and global levels, and highlight the importance of addressing these issues through effective agrarian policies. The study also analyses the link between food security and national security, emphasizing the role of a secure and sustainable food supply in ensuring the stability, well-being, and resilience of a nation. It describes the potential implications of food insecurity, such as social unrest, political instability, and economic vulnerabilities, and argue for the inclusion of food security as a key component of national security strategies. Additionally, it emphasizes the need for coordinated efforts among government institutions, agricultural stakeholders, and international organizations to develop strategies and programs aimed at enhancing food security at the national level (Topchii et al., 2021).

In addition, Yatsiv (2020) explores the relationship between export-import operations and the formation of food security in Ukraine. The study examines the impact of international trade, specifically export and import operations, on the food security of Ukraine. It also analyses the patterns, trends, and dynamics of agricultural trade, considering both the exports and imports of food products. The research investigates various aspects related to the influence of export-import operations on food security. This includes analysing the role of international trade in ensuring the availability and accessibility of food, evaluating the impact of trade policies and regulations on domestic food production and consumption, assessing the vulnerabilities and risks associated with relying on imports for food supply, and exploring strategies to enhance food security through trade. The study employs quantitative methods and data analysis to examine the relationships between export-import operations and food security indicators, such as food availability, affordability, and nutritional adequacy. It provides insights into the policy implications and recommendations for optimizing trade operations to strengthen food security in Ukraine.

Conclusions

The revitalization of the agrarian sector in Ukraine through the restoration of rural areas is crucial for ensuring food security and advancing the national interests of the country. Given the challenging circumstances of the war period, agriculture has suffered setbacks and requires state support to regain its vitality and fully restore socioeconomic opportunities for rural entrepreneurship. The implementation of socio-economic policy to revive the development of rural areas should be a strategic goal of significantly raising the standard of living of the rural population on the basis of qualitatively improved use of resource potential, fundamentally new approaches to the formation of productive forces and fundamental improvement of the ecological state of the regions. Substantiating measures to reorganize the economic mechanism of territorial development in the context of decentralization of rural areas, granting greater independence and responsibility to rural communities with the

support of private-state partnership entities will make it possible to activate the socio-economic and ecological situation in the village, regulate the demographic situation and satisfy the basic needs of the population demand for food.

Given the notable disparity in efficiency between the Ukrainian agricultural sector and its European counterparts, it is crucial to fundamentally reevaluate the approach to forming food security in specific industries. This entails embracing a diversification model for rural development, enhancing resource utilization efficiency, preserving and improving the environment, safeguarding the well-being of rural communities, and fostering stability within the food ecosystem. To promote economic, ecological, and social progress in rural areas and ensure a stable food supply in Ukraine's agrarian sector, the adoption of cutting-edge energy-saving agricultural technologies tailored to regional characteristics is imperative. These measures are expected to enhance production efficiency, increase yields, improve crop and livestock productivity, and stimulate the growth of organic farming, thereby bolstering the ecological dimension of the agrifood sector and enhancing the country's competitiveness in the global market.

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