Scientific Papers. Series D. Animal Science. Vol. LXVIII, No. 2, 2025
ISSN 2285-5750; ISSN CD-ROM 2285-5769; ISSN Online 2393-2260; ISSN-L 2285-5750

FOOD SECURITY IN THE REPUBLIC OF MOLDOVA: AN ANALYSIS BASED ON FAO DATA

Nicolae MOCANU[1], Silvius STANCIU[1, 2]

[1]"Dunărea de Jos" University of Galati, Romania
[2]Romanian Academy, "Costin C. Kiritescu" National Institute for Economic Researches, Romania

Corresponding author email: sstanciu@ugal.ro.

Abstract

Food security in the Republic of Moldova has been increasingly challenged in recent years due to low household incomes and regional geopolitical instability. Using FAO data and related sources, this study evaluates five key food security indicators recommended by international agencies: Average Dietary Energy Supply Adequacy (ADESA), GDP per capita (PPP), Average Protein Supply (APS), Prevalence of Undernourishment (PoU), and Food Supply Variability (FSV). The results reveal significant improvements in dietary energy availability and income levels, while highlighting persistent vulnerabilities related to food affordability and nutritional quality. With 27.2% of the population experiencing food insecurity, effective implementation of national food policies, including anti-waste legislation and support for local producers, is essential. Strengthening resilience and ensuring access to a diverse, healthy diet remain national priorities.

Key words*: ADESA, APS, FAO-UN, Food security, FSV, PoU.*

INTRODUCTION

Food security constitutes a fundamental pillar of public health policies, economic stability, and social cohesion. It represents a pressing issue at the national, regional, and global levels. In the context of the war in Ukraine, amid economic and geopolitical crises, food security in the Republic of Moldova has become a current and critical concern for both the population and public authorities. Low household incomes, the migration of labour from agriculture to urban areas or abroad, the globalization of trade, and rising global food prices are all factors that further hinder population access to food. According to the World Bank and the World Food Programme (The World Bank and the World Food Program, 2015) report on food security in the Republic of Moldova, the country faces significant challenges regarding food access and affordability, which affect its overall food security. The concern of Moldovan authorities for food security has materialized in the development of the Food Security Strategy of the Republic of Moldova for the years 2023-2030. According to this strategy, the primary drivers of agri-food production at the national level are small farmers and family farms, which account for over 62% of total agricultural output. Government priorities include protecting and improving the quality of life of disadvantaged groups, enhancing the competitiveness of Moldovan agricultural products on the international market, facilitating international trade to improve access to food, supporting sectors linked to agri-food production, and strengthening food quality and safety standards. Developing an efficient and resilient food, supply, and social protection system capable of withstanding emergencies and crises is a top priority of the government (Government of the Republic of Moldova, 2023).

The Food Security Strategy of the Republic of Moldova (2023-2030), proposed by authorities, was analysed by Sakovich & Cazacu (2023). The authors note that this strategy, and particularly the mechanisms for ensuring national food security, are not fully scientifically grounded and do not align with international standards. The strategy does not ensure an improvement in the population's living standards, while the rising poverty rate

and the decline in national agri-food production, particularly in the animal products sector, do not guarantee adequate food access and a proper diet for the population.

Agri-food security in the Republic of Moldova represents a strategic component of overall food security. Stratan et al. (2024) emphasize the paradox of a relatively high level of agri-food self-sufficiency occurring alongside a pronounced degree of absolute poverty among the population. This structural contradiction requires a complex approach to food security that goes beyond availability, focusing instead on identifying vulnerabilities and assessing the resilience of the national agri-food system to destabilizing factors (Stratan et al., 2024).

The structural vulnerability of Moldova's agri-food sector and its direct impact on national food security are also highlighted by Staver and Erhan (2024). The authors point out the overwhelming dominance of small farms, low productivity, the significant impact of climate change, and the sector's sensitivity to regional geopolitical shifts. Recent global and regional crises (the COVID-19 pandemic, Russia's aggression against Ukraine) have undermined food security, necessitating a multisectoral and resilient approach from authorities.

The assessment of food security levels in the Republic of Moldova, using key indicators such as physical and economic access to food, food consumption, and the nutritional balance of basic dietary components, was conducted by Rojco et al. (2020). The authors applied FAO's indicator-based methodology and highlighted the importance of monitoring a complex set of indicators, including per capita production of basic foods, self-sufficiency, dependence on food imports, food expenditures, and the nutritional value of daily diets. They emphasize the need for a new legislative framework in the Republic of Moldova that includes target indicators, rational consumption norms, and permanent food security monitoring mechanisms.

Sacovici (2021) conducted an analysis of food security in the Republic of Moldova over a 45-year period. He argued that the end of the 20th century marked the loss of Moldova's food independence, largely due to the collapse of the agro-industrial complex. A sharp decline in domestic food production and a substantial increase in imports of foods previously produced locally were the main drivers of this decline. The author claims that food security could be achieved through internal production, given the country's natural resource potential to produce essential food categories in both sufficient quantity and quality. His conclusions indicate that current domestic production and the internal food market are neither self-regulating nor self-sufficient and cannot function efficiently without public regulatory and support measures. The government should take responsibility for designing and implementing a national food security program that ensures the supply of locally-produced food to the population.

The study by Sakovici & Cazacu (2021) concludes that food security in the Republic of Moldova is not currently ensured. A qualitative transformation of agricultural production and an increase in economic efficiency are urgently required to meet internal demand.

The threats to food security in Moldova have intensified, influenced by political, macroeconomic, social, commercial, natural, and anthropogenic factors. Recently, the lack of technological progress and agro-ecological risks have become more pronounced.

Ensuring food security is a global issue, heavily influenced by population growth, limited natural resources, and climate change. The study by Munteanu (Pila) & Stanciu (2019) provides a comparative assessment of food security in Romania and the Republic of Moldova, using key indicators such as food availability, price volatility, agricultural output, and import dependency. Results show significant differences in food security between the two countries, though both are affected by similar types of threats. In both cases, the absence of coherent governmental strategies to support and protect the national agri-food sector has led to increased reliance on food imports.

Ensuring nutrient intake and food security in Moldova remains a major challenge, as approximately 23.5% of the population is

affected by food insecurity. In a study by Siminiuc et al. (2025), the cost and affordability of both a minimum and healthy food basket were evaluated, with food expenditures compared to national and international poverty thresholds. The findings reveal that around 52% of the population cannot afford the minimum food basket, and 78.6% cannot cover the cost of a healthy diet without reducing non-food spending. The authors conclude that urgent policies are needed to reduce accessibility gaps and to develop sustainable national strategies. According to the World Bank (2023), prolonged food price inflation amid military conflicts is severely affecting many developing economies, with low-income households suffering the most. Armed conflicts, political instability, and climate change are strongly impacting food security worldwide. Forced migration, economic collapse, failing public services, and limited access to humanitarian aid currently affect many impoverished regions.

According to the Food and Agriculture Organization of the United Nations (FAO) in its 2024 report on food security and nutrition, food insecurity in Eastern Europe and Central Asia is exacerbated by economic instability and regional conflicts. Low-income and vulnerable populations are compelled to allocate a substantial portion of their income to food, limiting their access to a nutritionally adequate diet (FAO, 2024a).

A high share of food expenses in household consumption reduces food security. The European Institute of Romania (2022) reports that rural households with lower incomes allocate a higher proportion of their monthly budget to food, making them more susceptible to food insecurity.

The World Bank's food security assessment report for the Republic of Moldova shows that the share of food expenditures in total household spending is around 41.9%, nearly three times higher than the EU average. This high proportion highlights the vulnerability of low-income households to food insecurity (World Bank, 2023).

The High-Level Panel of Experts on Food Security and Nutrition (HLPE) within FAO emphasizes the importance of diverse diets, including animal-based foods, for preventing malnutrition and ensuring adequate nutrition, especially for children, the elderly, and vulnerable groups. Malnutrition, characterized by imbalanced diets, is present in all regions of the world, regardless of income levels. In poor regions, a lack of essential nutrients due to low incomes prevails, while wealthier populations face nutritional imbalances associated with excessive consumption of ultra-processed foods, sugar, meat, and fats. HLPE recommends transforming global food systems to ensure access to healthy and sustainable diets for all. Their report highlights the urgent need for integrated nutrition policies at all societal levels. Coordinated action by public authorities and civil society is vital to combat undernutrition, obesity, and deficiencies in essential micronutrients (HLPE, 2017).

MATERIALS AND METHODS

The bibliographic documentation was based on open-access articles available on Google Scholar, ResearchGate, and Clarivate. Additionally, national reports from the Republic of Moldova in this field were consulted, along with literature focused on household spending trends and food waste reduction policies. The applied research was conducted through the analysis of statistical data provided by FAO-UN, Eurostat, the National Bureau of Statistics, and the World Bank for the period 2014–2023. The data were statistically processed, systematized in tables, and graphically represented. During the drafting and revision phase, artificial intelligence tools (such as ChatGPT) were used to structure specialized information, supplement secondary data from international scientific literature, and check the coherence and linguistic accuracy of the English-language text. The results were interpreted by the authors and validated through comparison with other sources from the specialized literature.

RESULTS AND DISCUSSIONS

FAOSTAT presents a series of indicators related to the level of global food security at the country level. For the purpose of the analysis, five relevant indicators were selected (based on the specialized literature), which are used in most reports of international agencies (Table 1).

Table 1. Selected indicators for analysis

Dimension	Indicator	Explanation
Availability	Average dietary energy supply adequacy (%)	Reflects how much of the energy requirement is covered
Economic access	GDP per capita, PPP (constant 2017 USD)	Proxy for purchasing power
Nutrition	Average protein supply (g/capita/day)	Quality of nutritional intake
Vulnerability	Prevalence of undernourishment (%)	Directly measures food insecurity
Instability	Per capita food supply variability (kcal/capita/day)	Fluctuations in food supply and access

Source: Authors, based on FAO (2023b).

The assessment of food security requires a multidimensional approach that covers the four key components: food availability, physical and economic access, nutritional utilization, and stability over time.
FAO recommends this set of relevant indicators, which can enable the monitoring of these dimensions at both national and international levels (HLPE, 2020).

Average dietary energy supply adequacy (%) (ADESA)
ADESA expresses the ratio between the available dietary energy supply and the average energy requirement of the population, being one of the most widely used FAO indicators for assessing food availability in relation to nutritional needs. It serves as a fundamental reference point for understanding food security at the national level.
The calculation is based on formula (1), according to FAO (2019).

$$\text{ADESA (\%)} = [(\text{Dietary energy supply (kcal/person/day)} / \text{Average dietary energy requirement (kcal/person/day)}] \times 100 \quad (1)$$

The indicator quantifies the amount of dietary energy available in a country, expressed as a percentage of the population's average energy requirement. Values above 100% indicate that the available dietary energy exceeds the population's needs, indicating a favorable level of energy-related food security.
The evolution of ADESA in the Republic of Moldova is shown in Figure 1.

Figure 1. ADESA in the Republic of Moldova.
Source: Authors' design based on FAO (2024b)

The graphically presented data in Figure 1 reveal a consistently positive trend for this index, increasing from slightly above 100% in the 2000-2002 period to over 125% in the 2020-2022 interval. This trend reflects a consistent improvement in the energy availability of food consumed by the population of the Republic of Moldova over the past 20 years.
Economic access to food can be quantified using the **Gross Domestic Product per capita, PPP (constant 2017 international $)** indicator (abbreviated as GDP/capita, PPP (const. 2017 int. $)) (World Bank, 2024). This indicator shows the average purchasing power of a citizen in a country, taking into account price differences between states.
A higher value of the indicator generally implies greater purchasing power, and thus easier economic access to food.
Therefore, even when an adequate food supply is available, low-income citizens may be unable to purchase the nutritionally and quantitatively necessary food due to high prices.
The evolution of GDP/capita, PPP (const. 2017 int. $) in the Republic of Moldova

during the period 2000–2022 is presented in Figure 2.

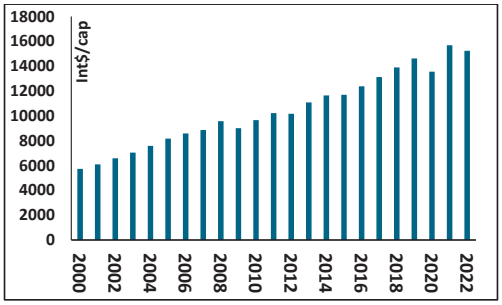

Figure 2. GDP/capita, PPP in the Republic of Moldova.
Source: Authors' design based on FAO (2024b)

According to the data presented in Figure 2, a constant and sustained increase of this indicator can be observed in the Republic of Moldova during the analyzed period. The indicator recorded a growth of 265%, highlighting significant progress in the country's economic development.

The Average Protein Supply (g/capita/day) (3-year average) indicator (abbreviated as APS (g/capita/day) represents the average daily amount of dietary protein available per person, expressed in grams per capita per day, calculated as a three-year average. Compared to ADESA, which refers to energy value, this indicator offers an assessment of the population's diet from the perspective of nutritional quality and value, not just quantity. FAO uses this indicator to evaluate national food availability, not actual food consumption. For an individual, ensuring an adequate protein intake is essential, as it supports muscle growth and maintenance, proper immune system function, and the prevention of protein-energy malnutrition.
The evolution of APS (g/capita/day) for the Republic of Moldova between 2000 and 2022 is presented in Figure 3.

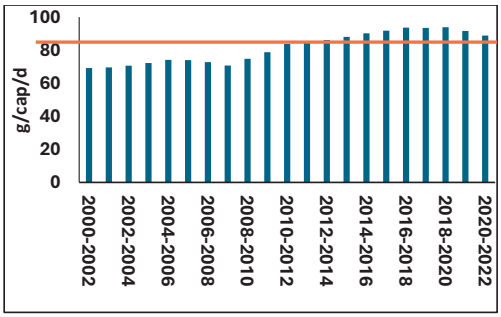

Figure 3. APS in the Republic of Moldova.
Source: Authors' design based on FAO (2024b)

The data presented show a constant and significant increase in protein availability up until around 2019, followed by a slight decline in values. This decrease is likely related to the COVID-19 pandemic, which triggered a mild economic crisis due to disruptions in supply chains (Stanciu, 2022).
Between 2000 and 2019, the indicator reflects an improvement in the quality of the population's diet at the national level.
The reduction observed in recent years may signal a new vulnerability, the causes of which should be investigated (possible causes include economic instability, the war in Ukraine, or inadequate agricultural policies).
According to FAO recommendations, values of the indicator exceeding 85-90 g/capita/day are considered adequate, reflecting a nutritionally balanced food supply. Only the last ten years have represented a satisfactory period from this perspective for the country's population.

The evolution of the **Prevalence of Undernourishment (percent) (3-year average) indicator (PoU %)** is shown in Figure 4.
PoU (%) values indicate the share of the population that does not have access to a minimally adequate energy intake. According to FAO (2024b), the indicator is a key reference for assessing food access and chronic energy malnutrition.

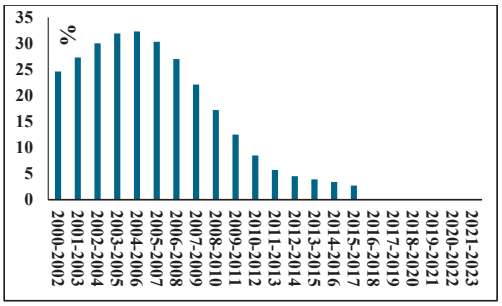

Figure 4. PoU in the Republic of Moldova.
Source: Authors' design based on FAO (2024b)

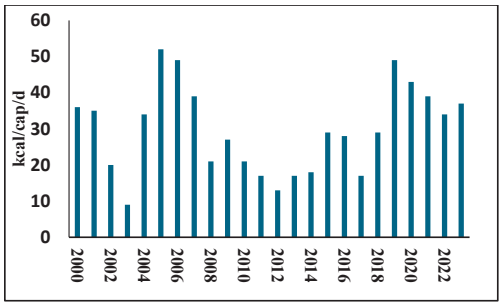

Figure 5. FSV in the Republic of Moldova.
Source: Authors' design based on FAO (2024b)

The maximum value of the indicator, 32.3%, was recorded during the 2003-2005 period. After this point, PoU (%) experienced a steady decline, reaching values below 2.5% in recent years. The evolution of the indicator shows significant progress in reducing chronic food insecurity among the population of the Republic of Moldova, supported by improved food availability and rising household incomes.

The approach of PoU values toward the 0% threshold in recent years may indicate that the Republic of Moldova is entering the category of countries with consolidated food security from the perspective of energy availability in the diet.

Estimated values of the **Per capita food supply variability (kcal/capita/day)** indicator (abbreviated as FSV (kcal/capita/day) for the 2000-2022 period is presented in Figure 5. According to FAO (2025), the evolution of this indicator reflects the annual instability of the energy food supply and is considered a key benchmark for assessing the resilience and stability of the food system.

Low FSV values indicate stability and resilience in the national food system. Sudden increases can be interpreted as signs of risks to food security (even when ADESA or APS values are high), indicating a lack of predictability in the population's food supply.

According to the presented data, significant fluctuations were recorded during the periods 2005-2006 and 2018-2020, with FSV values exceeding 45 kcal/capita/day. Possible explanations include agricultural production problems (due to droughts, floods, or other extreme weather events) or high economic volatility. The 2009-2014 period was characterized by reduced variability in the indicator's values, attributed to the relative stability of the national food system. These values may indicate the resilience of the national food supply chain in the face of external shocks.

CONCLUSIONS

The analysis of the five key indicators recommended by FAO - ADESA, GDP/capita (PPP), APS, PoU, and FSV - highlights an overall positive trend in food security in the Republic of Moldova over the past 20 years.

Although significant progress has been made regarding food availability and rising household incomes, vulnerabilities related to economic accessibility, nutritional balance, and food supply stability still persist. The recorded values indicate positive developments in this direction, reflecting an improvement in the food security of the Moldovan population. However, economic and social vulnerabilities continue to affect the country.

A better alignment of national programs with FAO standards, including the implementation of indicators for monitoring the population's diet, is recommended.

Increased support measures for SMEs in the agri-food sector may be a viable solution for improving the national food market.

REFERENCES

European Institute of Romania (2022). *Food security as an element of the Common Agricultural Policy and its impact on Romania.* Retrieved March 2, 2025, from https://ier.gov.ro/wp-content/uploads/2023/01/Studiul-1_SPOS-2022_Securitatea-alimentara_Final.pdf.

Food and Agriculture Organization of the United Nations (FAO) (2019). *The Suite of Food Security Indicators: Methods and standards.* FAO Statistics Division. Retrieved March 1, 2025, from https://www.fao.org/faostat/en/#data/FS.

Food and Agriculture Organization of the United Nations (FAO) (2024a). *The State of Food Security and Nutrition in the World 2024: Financing to end hunger, food insecurity and malnutrition in all its forms*. Food and Agriculture Organization of the United Nations. Retrieved March 1, 2025, from https://openknowledge.fao.org/items/ebe19244-9611-443c-a2a6-25cec697b361.

Food and Agriculture Organization of the United Nations (FAO). (2023a). *Regional Overview of Food Security and Nutrition in Europe and Central Asia 2023*. Retrieved March 1, 2025, from https://www.fao.org/3/cc3017en/online/cc3017en.html.

Food and Agriculture Organization of the United Nations (FAO) (2023b). *FAOSTAT – Food Security Indicators.* Retrieved March 1, 2025, from https://www.fao.org/faostat/en/#data/FS.

Government of the Republic of Moldova (2023). *Food Security Strategy of the Republic of Moldova for the years 2023–2030 was approved by the Government.* Retrieved March 1, 2025, from https://gov.md/ro/content/ strategia-securitatii-alimentare-republicii-moldova-pentru-anii-2023-2030-fost-aprobata-de.

High-Level Panel of Experts on Food Security and Nutrition (HLPE) (2017). Nutrition and food systems. Food and Agriculture Organization of the United Nations. Retrieved March 2, 2025, from http://www.fao.org/3/a-i7846e.pdf.

Munteanu (Pila), M., & Stanciu, S. (2019). Comparative aspects of food security in the Republic of Moldova and Romania. *Proceedings of the 33rd International Business Information Management Association Conference: Education Excellence and Innovation Management through Vision 2020*, Granada, Spain, I–X, 169–180. https://www.webofscience.com/wos/ woscc/full-record/WOS:000503988800017.

Rojco, A.A., Doga, V.S., & Ivanov, S.A. (2020). Assessment of the state of Republic of Moldova food security. *Accounting and Finance*, 88(2), 139–150. https://doi.org/10.33146/2307-9878-2020-2(88)-139-150.

Sacovici, V. (2021). Agroindustrial complex of Moldova in the context of ensuring food security. *Moldoscopie*, 92(1). https://doi.org/10.52388/1812-2566.2021.1(92).08

Sakovich, V., & Cazacu, V. (2023*).* Food security strategy of the Republic of Moldova (2023–2030) in the context of conceptual theoretical and practical approaches to population food supply. *International Relations Plus,* 22(2). https://doi.org/10.52327/1857-4440.2022.2(22).08

Sakovici, V., & Cazacu, V. (2021). Main challenges, threats and risks to food security of the Republic of Moldova in the modern period. *International Relations Plus,* 19(1). https://doi.org/10.52327/1857-4440.2021.1(19).19

Siminiuc, R., Țurcanu, D., & Siminiuc, S. (2025). Cost and affordability of the food basket in the Republic of Moldova. *Frontiers in Sustainable Food Systems*, 9. https://doi.org/10.3389/fsufs.2025.1453271

Stanciu, S. (2022). Post COVID-19 lessons: Could the SARS-CoV-2 virus be a progress factor? A literature review. *Annals of the University "Dunărea de Jos" of Galati: Fascicle I, Economics & Applied Informatics, 28*(2), 36–46. https://doi.org/10.35219/eai15840409265

Staver, L., & Erhan, L. (2023). The evolving state of agri-food security in the Republic of Moldova – A review. *Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development, 23*(2), 535–540. https://management journal.usamv.ro/pdf/vol.23_2/Art68.pdf.

Stratan, A., Lopotenco, V., & Staver, L. (2024). *Resilience of Agri-Food Security in the Republic of Moldova. In Agricultural Value Chain – Past Trends and Emerging Issues*. IntechOpen. https://doi.org/10.5772/intechopen.1008164.

World Bank and the World Food Program (2015). *Food security assessment in the Republic of Moldova.* Retrieved March 2, 2025, from https://documents.worldbank.org/curated/en/192371468000282307/pdf/ACS13175-ROMANIAN-WP-PUBLIC-Box391449B-Moldova-Food-Security-Assessment-ROM.pdf.

World Bank (2023). *Food Security Update.* Retrieved from https://www.worldbank.org/en /topic/agriculture/brief/food-security-update.

World Bank. (2024). *GDP per capita, PPP (constant 2017 international $)* [Data set]. World Development Indicators. Retrieved from https://data.worldbank.org/ indicator/NY.GDP.PCAP.PP.KD.