

## THE INTERCONNECTION MODEL BETWEEN THE REPUBLIC OF MOLDOVA'S FOOD SECURITY AND ITS AGRICULTURAL PRODUCTS EXPORT

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### Abstract

*The main objective of this study is to analyze the food security resilience of the Republic of Moldova. For this reason, it is essential to establish the interconnections between food security and foreign trade of the Republic of Moldova in the actual circumstances on the external market. On the one hand, agricultural economic agents faced the loss of traditional export markets. The most vulnerable category in this regard is 08. Edible fruits and nuts; peels of citrus fruits or melons, which in 2021 constituted 7.40% of the total exports. About 52.15% of the export of this category was directed in 2021 in Russian Federation. On the other hand, the increase in the prices of agri-food products has intensified the risks of excessive growth of exports and their potential insufficiency for consumption on the domestic market. In conclusion, it is highlighted that the situation in the region of our country generates vulnerabilities with a substantial impact on food security.*

**Key words:** food security, agricultural products, agriculture, export, trading partners.

### INTRODUCTION

The changes made under the influence of global crises have repercussions on strengthening the resilience of food security and, therefore, on the export potential of essential agri-food products.

For the Republic of Moldova, agri-food products are the main exported commodities and represent about 45% in total amount of exported merchandises which reflects the importance of agriculture in the economy (Cimpoies and Coser, 2018) [3].

Export is one of the determinants of the country economic growth, assuring jobs and income in agriculture and food industry, and balancing the payment balance (Litvin and Diaconu, 2018) [4].

That is why in this paper, we considered to be important to analyze Moldova's agri-food sector, and also the influence that the COVID-19 pandemic and the hostilities in the region have had on the agricultural sector and agrifood export.

The core of this research work is the analysis of the interconnection between food security

resilience following the export potential of the main agri-food products.

Researching the interconnections between food security and foreign trade has been in the sight of scientists in the field for a long time. This stems, on the one hand, from the importance of agriculture in ensuring the vital functions of the population, and on the other hand, from the role of export as a source of income for countries and import as a means of covering food sufficiency.

Moreover, agriculture must also be treated from the cultural and philosophical dimension and its impact on ecology. In this context, according to *Jennifer Clapp*, it is necessary to accept the assertion that agriculture fulfills different roles in society. It is imperative to balance these objectives with efficient reflections in commercial policy (Clapp, 2015) [2].

In this study we refer strictly to food security, according to the Declaration of The World Summit on Food Security from Rome (1996). It represents "a situation where everyone has social access to sufficient, safe, nutritious food to maintain a healthy and active life".

The mention of "all times" gives this notion a feature of perspective.

Food security is a fundamental factor in developing a country's economy. The concept of food security is complex and multidimensional. The official definition adopted by the World Food Summit is the following: "Food security, at the individual, household, national, regional and global levels [is achieved] when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life" (FAO, 1996) [6].

This definition was completed in 2001: "Food security [is] a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life" (FAO, 2002) [7].

The definitions show that the level of economic development determines national food security. This interdependence guarantees the stable supply of food products to the population, in the necessary quantity and according to scientifically determined norms, and the processing industry - in domestic raw agricultural materials. National agricultural production represents the basis for creating and maintaining food potential.

The development of domestic production of food products and raw agricultural materials creates confidence among the population in their sufficiency and is a way of managing risks that may arise in relations with exporting countries (harvest losses, import restrictions, price increases). The dimension of foreign trade, in the framework of food security, is a compelling aspect, both for exporting and importing countries. In both cases, foreign trade catalyzes economic development, guaranteeing increased income, demand, expansion of supply, and range of products. International trade revives production in those regions where conditions are optimal for it.

At the same time, foreign trade relations in the field of food supply solve problems such as the reliability of importing countries and the availability of an adequate level of foreign

exchange resources. Importing countries consider food and raw materials strategic commodities that ensure societal stability.

Exporting countries can use their position for economic and political pressure.

In this vein, we must also mention the *Agreement on Agriculture* of the WTO (WTO, 1993) [17], in which the long-term objective is stipulated "to provide for substantial progressive reductions in agricultural support and protection sustained over an agreed period, resulting in correcting and preventing restrictions and distortions in world agricultural markets".

*Elisabetta Aurino* [1] outlines that there are two fundamental ways through which time can be projected in the food security analysis. The first method relates to the evaluation component (ex-post and ex-ante).

The second modality has another aspect, through which the manifestation of time is involved in analyzing food security, arising from periodicity, and can be either chronic or transitory, a manifestation which, therefore, must have consequences in elaborating economic policies.

In the belief of a considerable part of the academic community in the field, trade liberalization can improve the food security situation of developing countries and reduce their food disproportion.

In this regard, to *Michael Trueblood & Shahla Shapouri*, low-income countries should focus on three areas of foreign agricultural trade that impact import prices and export earnings: market access, domestic support, and export subsidies (Trueblood & Shapouri, 2001) [16].

The impact of COVID-19 on the resilience of food security has been placed on the agenda of researchers the increasing international cooperation in fields related to this topic.

Thus, *Carlos Kuriyama* concluded that food security and foreign trade are complex, essential compartments that require further analysis (Kuriyama, 2020) [11].

In addition, the Republic of Moldova has faced many vulnerabilities regarding agricultural production and its profitability cause by the price boom for farm inputs in the last years, drought, and hostilities in the

region with a deep negative impact on its foreign agri-food trade and on food security. One of the crucial problems, that the Republic of Moldova had to overcome, was the reorientation of exports of its agri-food products to other markets.

Because of the increase in the prices of stock market agri-food products, the risks of an excessive elevate in agri-food products exports and their potential insufficiency for consumption on the domestic market intensified.

The multidimensional nature of food security has yet to be thoroughly researched in concordance with assessing the export potential of essential agri-food products.

For the Republic of Moldova, which is a country with a small and open economy, the issue of food security resilience is an essential one.

Risk management, which is emerging in the future, outlines the need to estimate the export of agri-food products from the perspective of food security resilience.

Assessing the Moldovan agri-food products export will highlight its interference with food security, provide opportunities for good European practices and identify possible development areas.

## MATERIALS AND METHODS

The primary data sources are represented by trade data provided by the International Trade Centre and National Bureau of Statistics of the Republic of Moldova and general statistical data provided by the National Bureau of Statistics of the Republic of Moldova.

The present analysis is based on a mix of complex scientific methods: quantitative and qualitative. At the same time, during the research, the following strategies were used: case study and experiment.

## RESULTS AND DISCUSSIONS

The Republic of Moldova is a country where agriculture has not only an essential contribution to the formation of GDP (Fig. 1)

but also a particular philosophical connotation in the culture and tradition of the people.

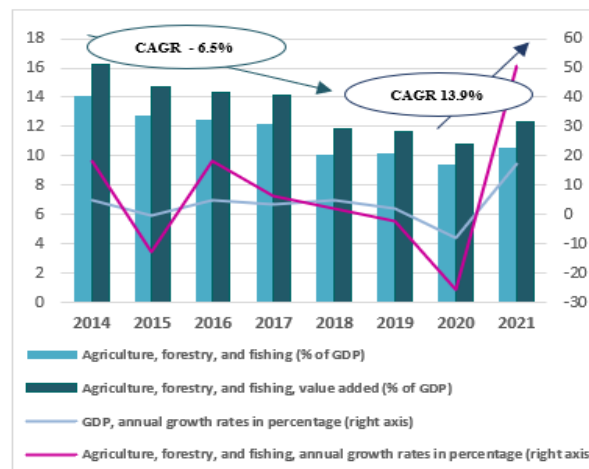


Fig. 1. The contribution of agriculture to Moldovan economic development, %  
Source: (NBS, 2021) [12].

The CAGR indicator was applied to the contribution of agriculture, forestry, and fishing to the formation of gross added value, in order to highlight the role of agriculture in the economic development of the Republic of Moldova. Thus, in the last eight years, two periods have emerged. The first period is a long one (2014-2020), in which the participation of agriculture in the formation of added value decreased (CAGR -6.5%). In the second period (2020-2021), the CAGR increased by 13.9% (Fig. 1).

Agriculture, the most multifunctional branch of the national economy, includes vast fields of impact on society. Moreover, the functions of agriculture are more comprehensive than just food production for the population. Its contribution thus incorporates spheres such as food security; social stability; rural life; environmental services; rural landscapes; societal identity and cultural heritage, and agricultural products (Potter & Tilzey, 2007) [15].

In the present study, we will focus on the interdependence of food security of the Republic of Moldova and foreign trade in the actual context of the external market. Several composite indices are calculated to assess food security in international practice.

One of the most popular is the Global Food Security Index, which comprises four sub-

indices (affordability, availability, quality and bsafety, sustainability, and adaptation) and is calculated for 113 countries.

The Republic of Moldova, unfortunately, is not among these states (Economist Impact, 2022) [5]. Another approach is to determine food insecurity. One such important food security index is the Global Hunger Index, which measures hunger at the global level. In Fig. 2 it is shown the evolution of Global Hunger Index-GHI [9].

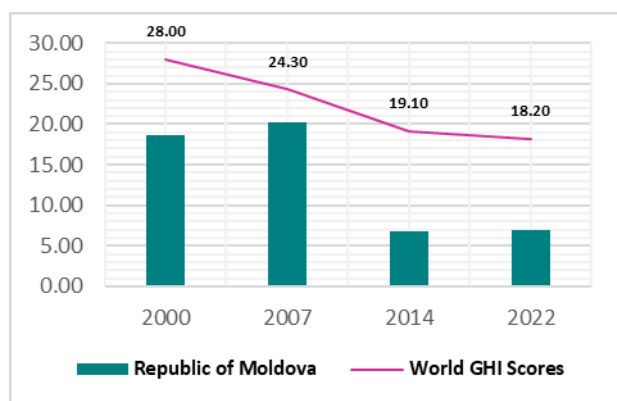


Fig. 2. The Global Hunger Index, 2000-2022  
 Source:(Global Hunger, 2022) [9].

The Republic of Moldova was ranked 32 out of 136 countries, scoring 6.9 points in 2022. If the score is lower than 9.9 – the hunger level is low, between 10-19.9 - moderate; between

20.0-34.9 - profound; more than 35 – is alarming (Global Hunger, 2022) [9].

Another set of indicators related to food security that have returned, from the shadows, in the studies of researchers during COVID-19 is food independence and self-satisfaction. Therefore, in the first stage of analyzing the Republic of Moldova's food self-sufficiency the dynamics of foreign trade with agri-food products must be examined (Fig. 3).

Between 2014 and 2022, the evolution of exports and imports of agri-food products was distinctly manifested.

Thus, in the dynamics of exports, following the application of CAGR, four periods were highlighted (decrease (2014-2015, CAGR -14.2%; 2019-2020, CAGR -10.2%) and growth (2015-2019, CAGR 6.3%; 2021-2022, CAGR 33.4%)), while in the evolution of imports, there were two periods: one of decrease (2014-2015, CAGR -18.5%;) and one of increase (2015-2022, CAGR 11.9%). The first period of decrease in foreign trade is due to the banking crisis in the Republic of Moldova and the sanctions imposed on the exports of Moldovan agri-food products by the Russian Federation. The second period of export decrease is a consequence of the COVID-19 pandemic (Fig. 3).

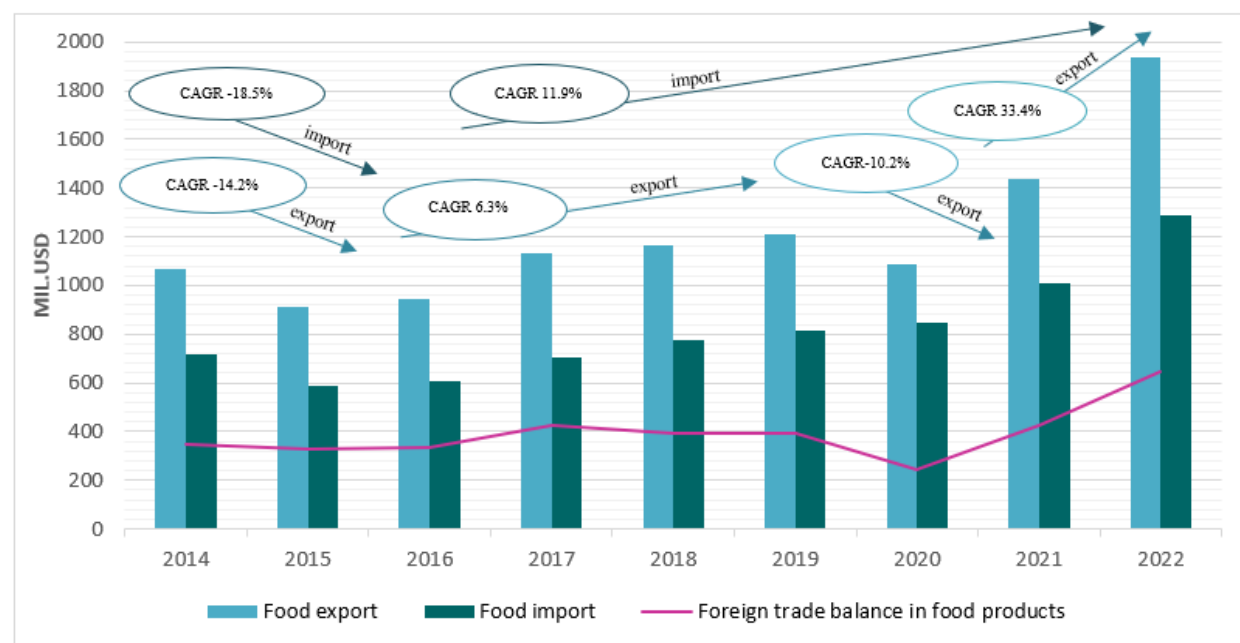


Fig. 3. Imports and exports dynamics of Moldovan agri-food products (USD million)  
 Source: National Bureau of Statistics, NBS, 2022a [13].

At the same time, we must mention that during the last eight years, the balance of foreign trade with agri-food products has been positive, although, in the last period, a tendency for its reduction can be observed.

As for the share of imports of agri-food products in total imports, it varied in the range of 13.44%-15.62% during the years 2014-2022 (Fig. 4).

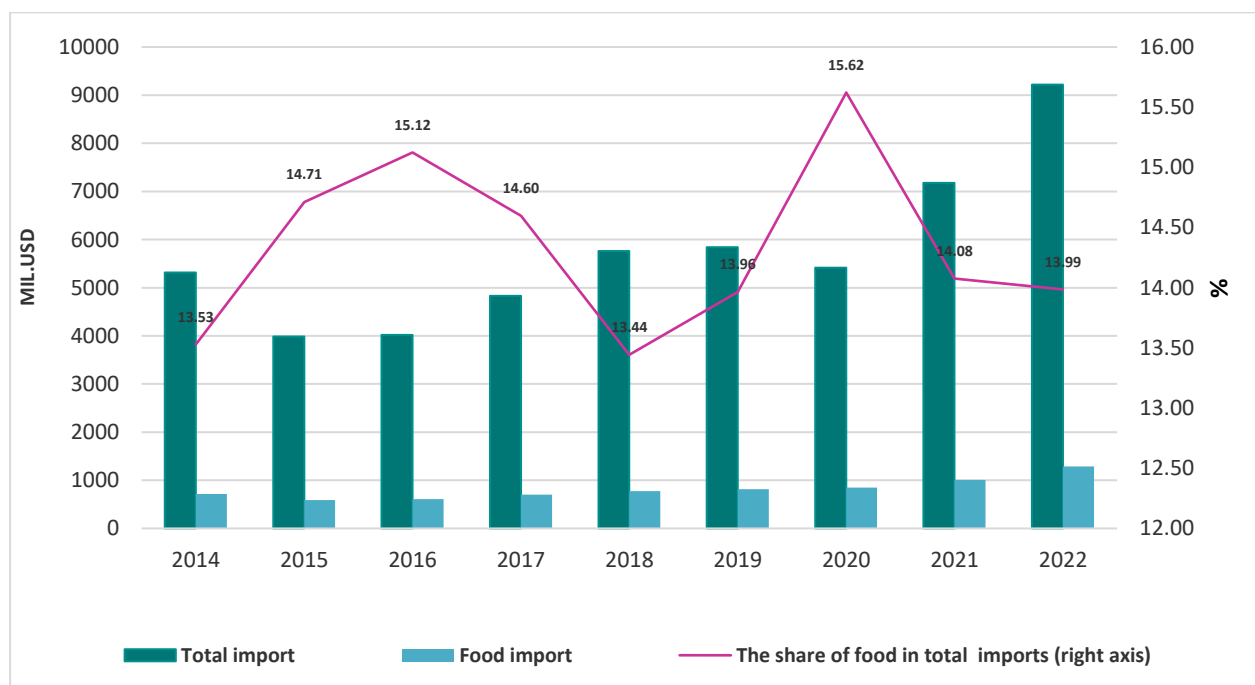


Fig. 4. The share agri-food imports in total imports, %  
 Source: (NBS, 2022, a) [13].

For a clearer vision, two indicators are calculated in international practice through which food independence and self-satisfaction can be assessed, namely SSR (Self-Sufficiency Ratio) and IDR (Import Dependency Ratio).

According to the FAO methodology (FAO, 2017) [8], these indicators are determined as follows:

$$SSR = \frac{FP}{FP+I-E} \times 100\% \quad (1)$$

where:

- FP–Food Production;
- I–Imports;
- E–Exports.

$$IDR = \frac{I}{FP+I-E} \times 100\% \quad (2)$$

A higher IDR value indicates a greater dependence on agri-food product imports. While an SSR of more than 100 means more self-sufficiency. As a result of analyzing their

evolution from 1997-2022 by applying descriptive statistics, one can note that the average value of the SSR in the Republic of Moldova represents 126% and the IDR 35%. In 2022, when the hostilities in region started, these values accounted for 130.00% and 59.78%, respectively (Fig. 5).

Therefore, both indicators exceeded the average of the analyzed period.

Thus, in the case of SSR, one can notice a positive signal that indicates an increase in the self-sufficiency level; then, in the situation of increasing the IDR, it is a negative signal because the dependence on imported agri-food products has increased.

For a deeper understanding of the relationship between the level of food self-sufficiency of the Republic of Moldova and the export of agri-food products, it is opportune to determine the correlation between these two variables.

It is generally accepted that the strength of the correlation coefficient, as an indicator of the

degree of interdependence, differentiates into three levels for both positive and negative

correlations.

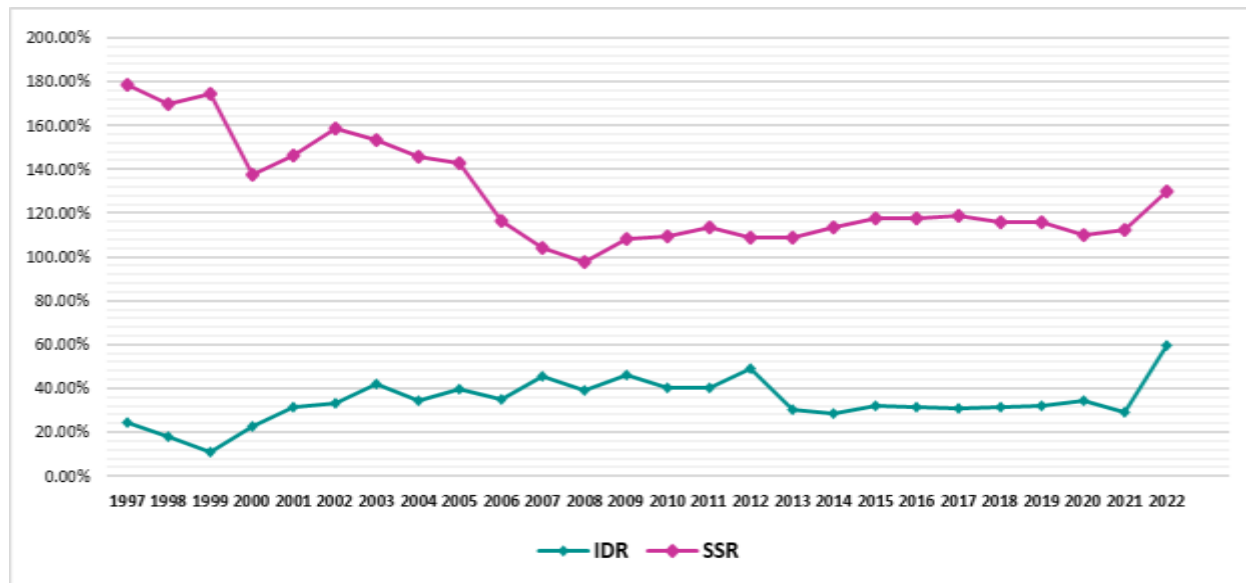


Fig. 5. Republic of Moldova's Self-Sufficiency Ratio and Import Dependency Ratio dynamics  
 Source: Own results.

In the case of the Republic of Moldova, there is a weak positive relationship between the export of agri-food products and SSR, ( $\rho = 0.218$ ), which means that the export of Moldovan agri-food products, for the most part, should not affect the food security of the country (Fig. 6).

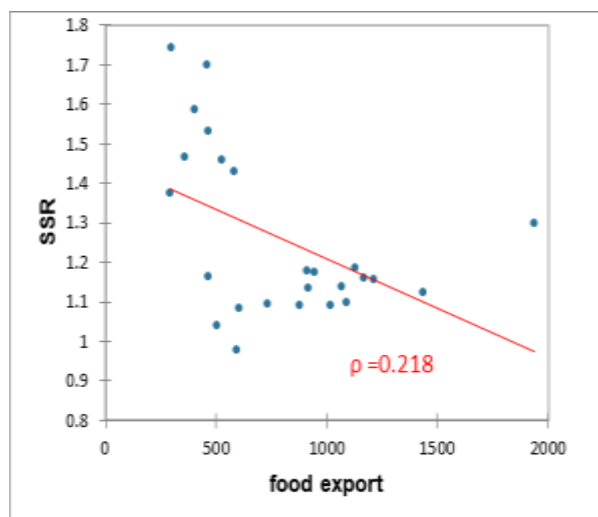


Fig. 6. Correlation among food export and SSR  
 Source: analysis data.

Moldovan agri-food exports depend on the external market fluctuations and the appearance of the hostilities in the region produced important changes in structure of its agri-food exports (Fig. 7).

Figure 7 shows that the most vulnerable category is apples and pears, as 97% of this category was exported to Russia, its share being 6% of the total exports of agri-food products (ITC, 2021) [10].

Two other essential categories are grapes and cherries, apricots, and peaches. Therefore, under the created conditions, the governors had to find new markets relatively quickly.

Food security has become a serious issue due to the increase in the quotations of agricultural products in the commodity market, which could have led to increased exports of these products as well as a shortage in the domestic market. In this context, the authorities have introduced restrictions on the export of the following agricultural products: wheat; flour; maize; sunflower. These bans were gradually repealed.

However, it should be noted that even in the conditions of some restrictions on the export of some categories of agri-food products, but also of the difficulties of accessing the traditional markets for the sale of other products, in 2022, there were increases in the export of the following categories: cereals (111.35%), products of the milling industry, malt, starch, insulin, wheat gluten (335.90%), oleaginous seeds and fruits, various seeds and

fruits, industrial and medicinal plants, straw, and fodder (152.32 %), preparations based on cereals, flour, starch, starch or milk pastry

products (120.51%), vegetable preparations, from fruits, nuts, or other plant parts (136.31%).

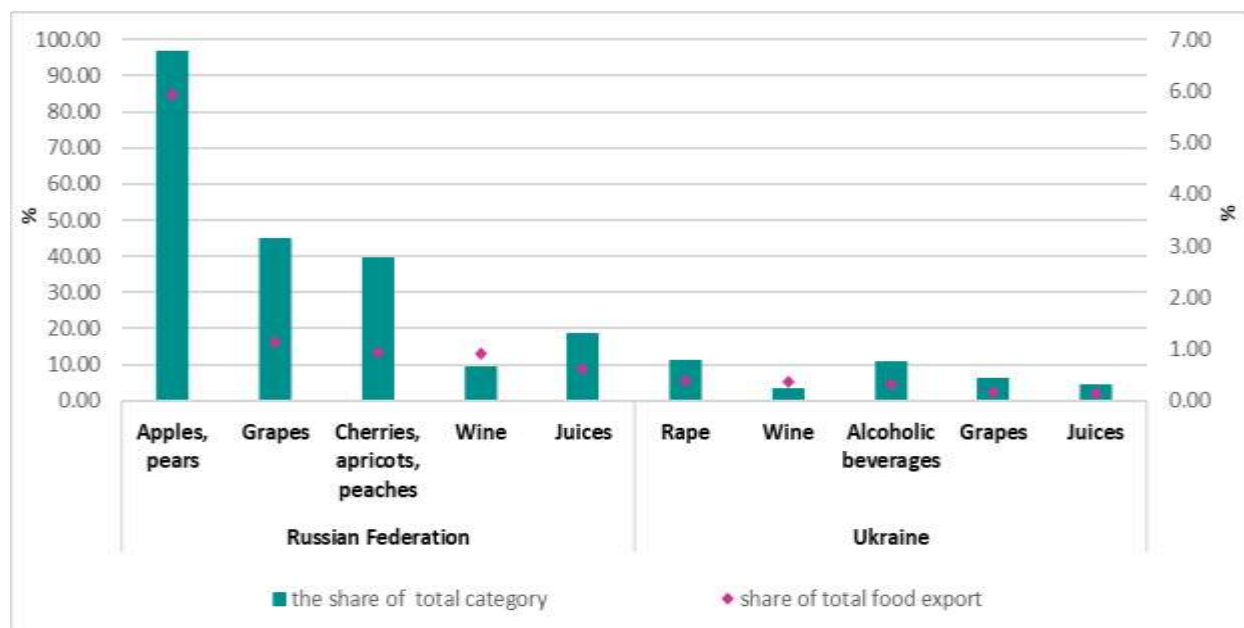


Fig. 7. The main categories of food products exported to Russia and Ukraine, %, 2021  
 Source: ITC, 2021 [10].

At the same time, we must emphasize that the specifics of the economy of the Republic of Moldova, as well as the current situation, indicate the fact that the country's self-sufficiency level is close to 100% for most food products, except for some products, such

as butter (58.5%); poultry meat (66.7%); tomatoes (40.4%); cucumbers (63.5%); potatoes (68.5%); oats (33.0%).

Figure 8 shows that, for the most part, the Consumer Price Index-CPI of agri-food products exceeded the total CPI in 2022.

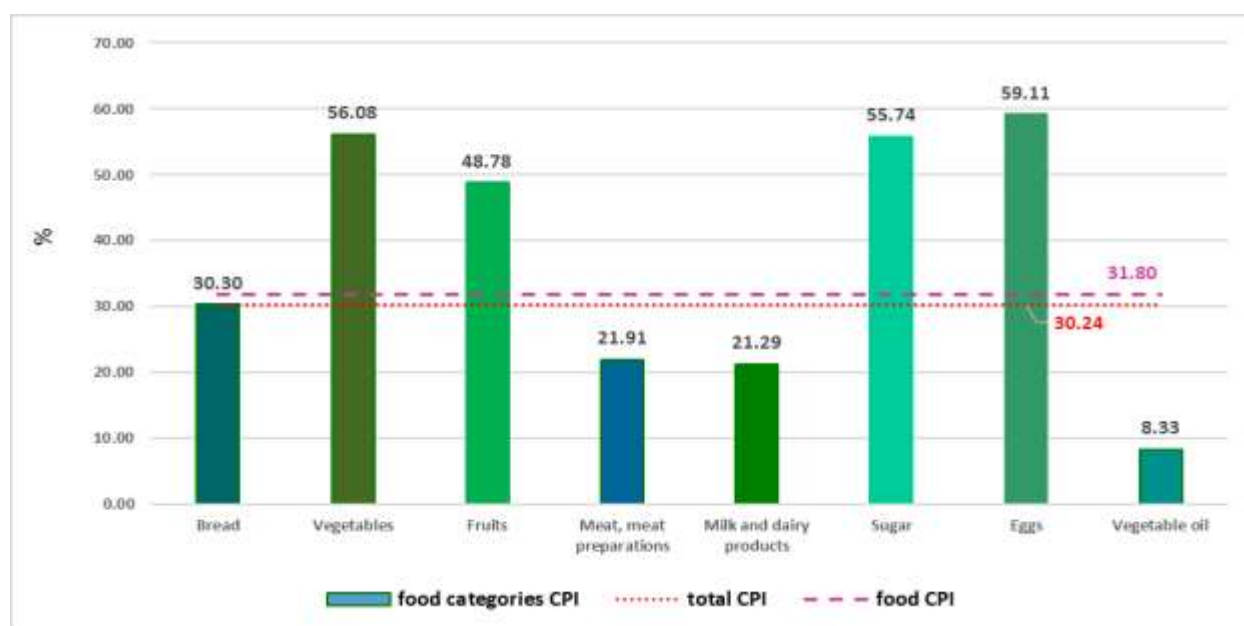


Fig. 8. The Consumer Price Index for the main food products, %, 2022  
 Source: NBS.(2022, b) [14].

The most significant increase was recorded in the following categories: eggs (59.1%), vegetables (56.08%), and fruits (48.78%). This evolution of the CPI for agri-food products can be considered alarming for the resilience of the food security of the Republic of Moldova ( Fig. 8).

The crucial issue in food security is not the physical availability of food products, but the physical access to them.

In this context, the evolution of the CPI for the main agri-food products, in 2022, shows us the area with which the authorities of the Republic of Moldova must be concerned, in order not to allow food insecurity for the vulnerable categories of citizens of the Republic of Moldova.

## CONCLUSIONS

The long-standing debates on the meanings of foreign trade as a threat or an opportunity for food security remain, to date, under examination. The potential of exporting essential agri-food products, correlated with food security, constituting multidimensional problems that connect directly with national economies, is in constant tension in a rapidly changing global environment. This process forces global economic governance, on the one hand, and national governments, on the other, to design a framework to address food security resilience, concurrently with export fortification, to adapt it to its goals. It also induces the scientific community from the field to reflect on the complex nature of food security, bringing new visions and methodologies that would facilitate foreign trade.

Under these conditions, the economy of the Republic of Moldova, being a small and open one, is exposed to all the processes carried out within the global economy under the influence of internal and external vulnerabilities. Therefore, the multitude of risks to which both food security and foreign trade are subject have repercussions on the functioning of the economic system of the Republic of Moldova and, therefore, on the population's well-being.

The recognition of the relevance of the sustainable economic development of food security and the strengthening of exports of the main agri-food products, particularly in the conditions of cataclysms, determined the need for research in this field.

The Republic of Moldova has a sensitive economy and exogenous shocks instability on the international market could deeply affect the country foreign trade.

In last period, because of the instabilities in the region, on the one hand, the traditional export markets of some categories of agri-food products were impossible to access, on the other hand, food security risks intensified as in consequence of the potential growth in exports because of the increase in the prices of agri-food products on the international market.

However, the most substantial impact on the resilience of food security in the Republic of Moldova had the significant rise in the inflation of agri-food products caused by increased prices of imported energy resources.

## ACKNOWLEDGEMENTS

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