Analysis of agrifood exports and self-sufficiency in the Republic of Moldova: linking production and trade data for evidence-based policy[1]

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Abstract

The agricultural sector plays a vital role in the economy of the Republic of Moldova, significantly contributing to national exports, employment and food security. This study analyses the dynamics of agrifood exports, domestic production, and self-sufficiency levels during the period 2015–2024. The aim is to assess the relationship between production capacity, export performance, and domestic food availability, providing insights into Moldova's resilience and competitiveness in the regional agrifood market.

The research integrates multiple statistical sources to develop a comprehensive overview of Moldova's agrifood balance. Export trends were analyzed by major product groups - cereals, oilseed, leguminous crops, vegetables, fruit and nuts, grapes, main animal products, representing the main pillars of the country's agricultural production and trade. The study employs analyses to evaluate the consistency between production and exports, as well as self-sufficiency ratios derived from national food balance sheets.

Results reveal that Moldova remains a strong net exporter of crop-based agrifood products, particularly oilseed crops, cereals and fruits, while maintaining partial dependence on imports for animal-origin products. Traditionally, domestic production exceeded consumption for several key categories, such as cereals, fruits and nuts, grapes, oilseed, leguminous crops, indicating robust production and export potential in these sectors. However, self-sufficiency level is low for main animal products, potatoes, vegetables, highlighting continued challenges in livestock and perishable crop production.

The analysis of mirror statistics also points discrepancies between declared export data and corresponding partner import records, suggesting mis/underreporting or re-export phenomena in selected product lines.

Overall, the study underscores a dual characteristic of Moldova's agrifood system: strong export performance in specific high-value sectors alongside persistent import dependency in others. The results emphasize the need for integrated data systems linking production, trade, and consumption statistics to support evidence-based policy planning. Strengthening agricultural value chains, promoting diversification, and improving statistical interoperability between national and international data sources are essential for ensuring food security and export sustainability in small, trade-dependent economies.

Keywords: agrifood trade, agricultural production, self-sufficiency, food security

1. Introduction

Agriculture continues to play a strategic role in the Republic of Moldova, despite a gradual decline in its contribution to gross domestic product - from 13,3% in 2015 to 7,4%

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in 2025[2]. The sector remains essential for rural employment, export earnings, and national food security. its contribution to the work force is still important, comprising 14,0% of the occupied population of the country and in the total export of goods -27,1%, but together with the prepared foodstuff make 45,7%.

Over the last decade, Moldova has strengthened its integration into international markets, particularly through agrifood exports. However, this integration has exposed structural imbalances within the agricultural system. While crop production has become increasingly competitive and export-oriented, livestock production has stagnated, leading to growing dependence on imports for certain food categories.

Understanding the relationship between agricultural production, external trade, and domestic consumption is critical for designing effective policies. This study aims to provide a comprehensive analysis of these linkages by examining production trends, trade flows, and self-sufficiency indicators over the period 2015–2024.

The analysis is based on multiple data sources to ensure robustness and comparability: (i) National Bureau of Statistics (NBS) of the Republic of Moldova (RM) providing production, international trade and consumption related data; (ii) international trade statistics provided by international organizations.

The study employs in particular the following indicators: (i) Self-Sufficiency Ratio (SSR); (ii) Revealed Comparative Advantage (RCA) and (iii) Herfindahl–Hirschman Index (HHI).

The methodology combines descriptive statistics with comparative analysis to identify trends and structural patterns across the study period.

In the context of the present study, agrifood products include the types of goods covered in the first 4 Sections of the Harmonized Commodity Description and Coding System generally referred to as "Harmonized System" (HS): (I) Live animals & animal products ((HS Chapters 01-05); (II) Vegetable products (06-14); (III) Animal or vegetable fats & oils (15); (IV) Prepared foodstuffs, beverages, spirits and vinegar, tobacco (16-24).

2. Agricultural production

The agricultural land accounts for around 73% from the total country's land that indicates a significant, foundational reliance on agriculture. In its turn, agricultural production in Moldova is characterized by a strong dominance of crop-based activities. Crop farming accounts for more than 2/3 of the gross agricultural production. Cereals (particularly maize and wheat), sunflower seeds, fruits and grapes represent the core of agricultural output (see Fig.1).

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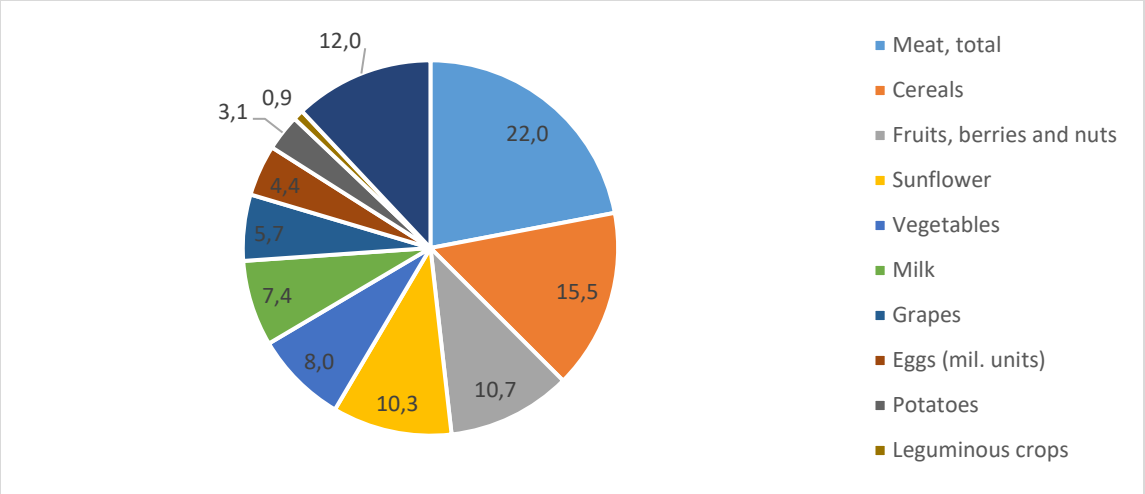

Figure 1. Share in agricultural production, %
Source: National Bureau of Statistics of the RM [1], author's calculations

Production levels exhibit significant volatility, largely driven by exogenous shocks like climatic conditions. For instance, drought years such as 2020, 2022, 2024 resulted in substantial declines in output (e.g. in 2020 the annual decrease of production was 36% in crop farming and 27% in the overall agricultural production), while favorable weather conditions in subsequent years led to recovery (such as in 2021, when crop and total agricultural output raised by 1,9 times and 1,6 times respectively) (see Fig.2).

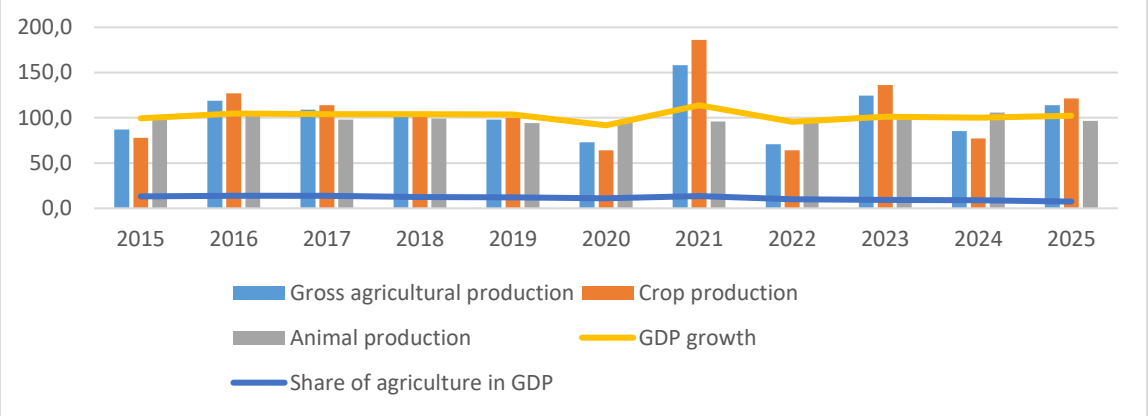

Figure 2. GDP growth and agricultural production by sector, in % to the previous year
Source: National Bureau of Statistics of the RM [1], author's calculations

In contrast, livestock production demonstrates a declining or stagnant trend. In particular, milk production, as well as beef production, have decreased steadily (almost 2 times from 2015 to 2025), reflecting structural weaknesses such fragmentation of farms and reduction of the livestock number (by more than 40% in the last decade). However, the level of production in pork and poultry farming is relatively stable.

The imbalance between crop and livestock production is a defining feature of Moldova's agricultural system and has direct implications for overall agrifood production

of the country, trade and food security. In its turn, agricultural activity forms the foundation of industrial processing. Within total industrial output, agriculture contributes around 40%, including approximately 30% from food manufacturing and around 8% from beverage production, of which nearly 5% is attributed to wine-making.

The agricultural sector of the country is highly vulnerable to adverse climate conditions, but also is affected by a fragmented farm structure, which limit productivity and competitiveness.

In 2024, legal entities and other farms with area of 50 hectares and more accounted for ½ of the total agricultural land. The small agricultural producers (up to 10 ha), including households involved in agricultural production operated 31,1% of the total agricultural land and produced 43,7% of the agricultural output. Especially important is the share of household sector in livestock production. As of the beginning of 2025, this sector held 91,6% of the sheep livestock, almost 2/3 of the cattle population and more than 1/3 of pigs.

In addition, external factors, such as regional crisises in energy sector, Russia's war in Ukraine and associated international price volatility, continue to constrain the sector's competitiveness and diminish long-term resilience [2]. Thus, starting with 2020, up to 2025, farm-gate prices in Moldova increased to 1,6 times, including for crop products - to 1,7 times and for livestock products – by 40%.

3. External trade of agrifood products

Moldova's agrifood exports accounted for 1624,3 million USD, or 45,7% of the total export in 2024, varying from 43,1% in 2018 to 46,6% in 2017. At the level of the Harmonized System classification's sections, the share in total export by product type, in 2024 constituted (see Fig.3): for *live animals & animal products* – 1%; *vegetable products* – 27,1%; *animal or vegetable fats & oils* – 3,5%; prepared *foodstuffs, beverages, spirits and vinegar, tobacco* – 14,2%.

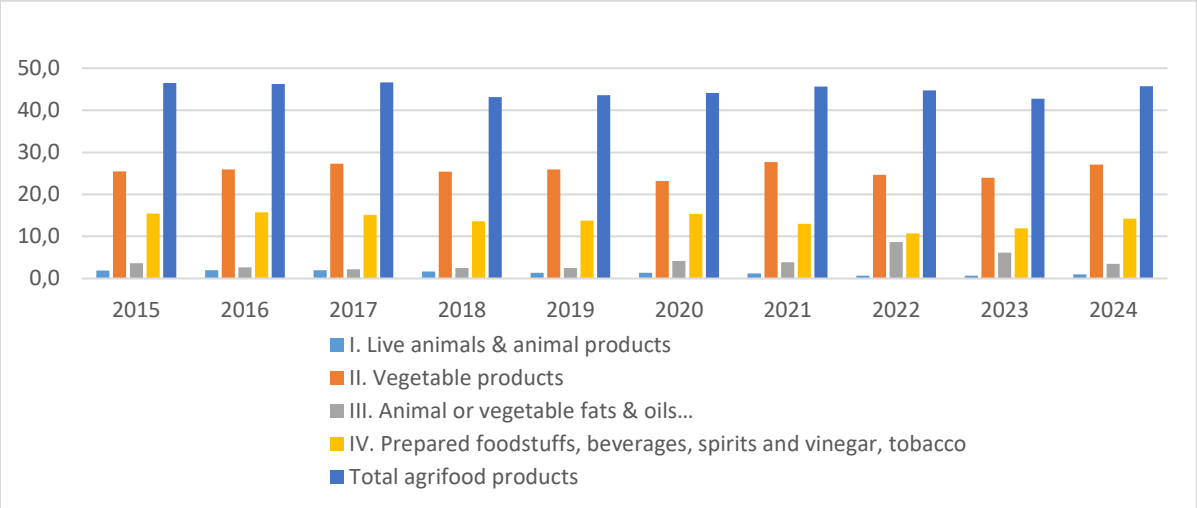

Figure 3. Share of agrifood products in total export in 2015-2024 by HS Section, %

Source: National Bureau of Statistics of the RM [1], author's calculations

Moldova's agrifood system is highly concentrated in a limited number of key products (Fig.4). It is characterized by a strong export performance in sectors such as cereals (accounting for 8,2 % of total exports and 17,9% of agrifood products export),

edible fruits and nuts (7,9% and 17,4% respectively), beverages, spirits and vinegar (7,6% and 16,7%), preparations of vegetables, fruit, nuts (3,8% and 8,2%), animal or vegetable fats and oils (3,5% and 7,6%). These products generate consistent trade surpluses and demonstrate strong international competitiveness.

Conversely, imports of agrifood products are dominated by: dairy produce, birds eggs (1,6% and 10,1%), prepared foodstuffs, beverages, spirits and vinegar, tobacco (1,3% and 7,8%), edible fruit and nuts (1,2% and 7,1%); edible vegetables (1,1% and 7,0%), preparations of cereals, flour, starch or milk (1,1% and 6,9%).

The trade balance for Moldova's agrifood products accounted in 2024 for 159,8 million USD, being determined by the trade surplus marked for *crop/vegetable products* (553,7 mil. USD) and *animal or vegetable fats & oils* (42,9 mil. USD), while in two other HS imports exceeded exports for: *live animals & animal products* – by 300,5 mil. USD and for *prepared foodstuffs, beverages, spirits and vinegar, tobacco* – by 136,3 mil. USD (see Fig. 4).

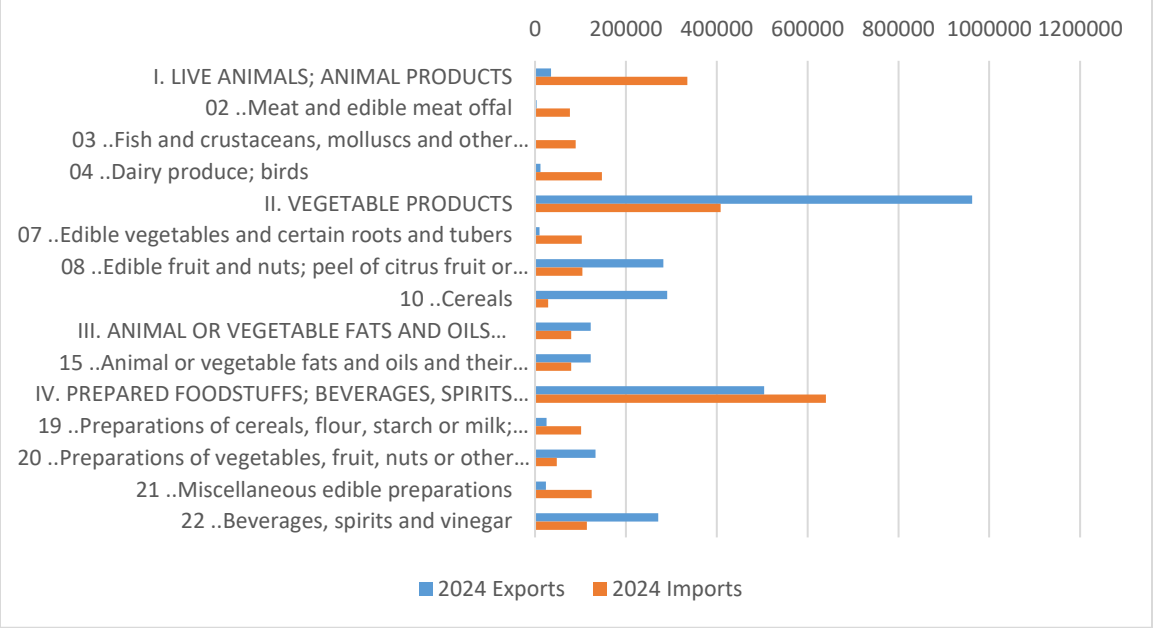

Figure 4: Export and import of main types of agrifoods in 2025, thousand USD
Source: National Bureau of Statistics of the RM [1], author's calculations

This pattern reflects structural specialization in primary crop production, production of beverages, spirits and vinegar (especially of wine production) and reliance on external markets for higher value-added and livestock-based products.

The analysis of the Revealed Comparative Advantage (RCA) values for top 10 product types at the HS chapter level, that accounted for 1/3 of Moldovan total export value during the last decade shows that Moldova has not only maintained but significantly strengthened its position as a highly competitive, specialized exporter of sunflower seeds (HS 1206) on the global market, the RCA index being increased from 390 in 2015 to almost 441 in 2024 (see Table 1).

High export competitiveness was achieved in 2024 also for fresh fruits such as apples, apricots, cherries, peaches (HS 0808 and 0809) with the RCA score of over 47, as well as for grapes fresh or dry (HS 0806), with the RCA index of 33.

The Republic of Moldova exports more intensively than the rest of the world, with a growing specialization also rape or colza seeds (HS1205, RCA index increased by 18), wheat (HS 1001, RCA index increased by 15), fruit or nut juices (HS 2204, RCA+10).

While RCA analysis confirms Moldova's growing comparative advantage for a set of crop-based exports, Herfindahl-Hirschman Index (HHI) indicates a well-diversified trade portfolio for wine (HS 2204), as well as for apricots, cherries, peaches (HS 0809), the HHI being below 0,15 (1500 points).

The value of the HHI below 0,25 (2500 points) suggests a moderate concentration of exports among trade partners for maize (HS1005), sunflower etc. seed oil (HS 1512) and grapes. However, high market concentration and reliance on a few markets is observed for a number of high-value agrifood products, such as: wheat and meslin, for which HHI increased from 0,12 in 2015 to 0,48 in 2024; rape or colza seeds (from 0,25 to 0,46), apples, pears & quinces (from 0,31 to 0,41); fruit or nut juices (from 0,21 to 0,31) and sunflower seeds (from 0,27 to 0,31), suggesting vulnerability to external shocks such as price fluctuations and trade disruptions.

Table 2. Revealed Comparative Advantage (RCA) and Herfindahl Hirshman Market Concentration Index (HHMI) for the top exported agrifood products by the Republic of Moldova, in 2015 and 2024

Product		RCA		HHMI		Share in Moldovan export,%	
HS cod	**Name**	**2015**	**2024**	**2015**	**2024**	**2015**	**2024**
1206	Sunflower seeds, whether or not broken:	390,1	440,7	0,27	0,31	7,3	8,6
1001	Wheat and meslin:	11,3	25,3	0,12	0,48	2,7	5,6
2204	Wine of fresh grapes, including fortified wines; grape must other than that of heading 2009:	25,6	24,8	0,11	0,11	5,0	4,0
1512	Sunflower-seed, safflower or cotton-seed oil and fractions thereof, whether or not refined, but not chemically modified	66,9	42,4	0,42	0,16	3,5	3,2
2009	Fruit or nut juices (including grape must and coconut water) and vegetable juices, unfermented and not containing added spirit, whether or not containing added sugar or other sweetening matter:	19,2	30,6	0,22	0,31	1,8	2,7
0808	Apples, pears and quinces, fresh:	15,9	47,7	0,31	0,41	0,9	2,1
0809	Apricots, cherries, peaches	52,8	47,7	0,76	0,11	1,6	2,0
1005	Maize (corn):	12,8	9,9	0,15	0,15	2,2	1,9
0806	Grapes, fresh or dried:	15,3	32,6	0,28	0,24	0,9	1,7
1205	Rape or colza seeds, whether or not broken:	6,9	25,1	0,25	0,46	0,4	1,4

Source: National Bureau of Statistics of the RM [1], UN Comtrade [3], International Trade Center [4], author's calculations

Mirror statistics for top four agrifood product types (sunflower seeds, wheat and meslin, wine and sunflower seeds oil) exported by the RM in 2024 reveal discrepancies up to 1/3 between reported exports and biggest four partner country imports, indicating issues such as not accurate or under-reporting, timing differences, or re-export flows.

4. Consumption and self-sufficiency

Self-sufficiency analysis highlights a dual structure in Moldova's food system.

Despite the marked volatility of agricultural production, for cereals, fruits, sunflower seeds, and grapes, domestic output is largely sufficient to meet country's internal consumption needs.

Thus, products with **high self-sufficiency ratio** include**:** sunflower seeds (267,0% in 2015-2024, on average), fruits, berries and nuts (227,7%), especially nuts (320,7%) and apples (231,8%), cereals (145,4%), especially wheat (167,8%) and grapes (108,8%) (see Fig.5). These sectors produce significant surpluses and are strongly export-oriented.

Low self-sufficiency ratio is observed for**:** potatoes (70,7%), milk and dairy products (73,0%), meat (80,5%) and vegetables (86,9%).

In comparison with the average decade's level, in 2024 self-sufficiency improved for cereals, especially maize, grapes, was stable for berries, poultry and pork meat production and decreased for other products.

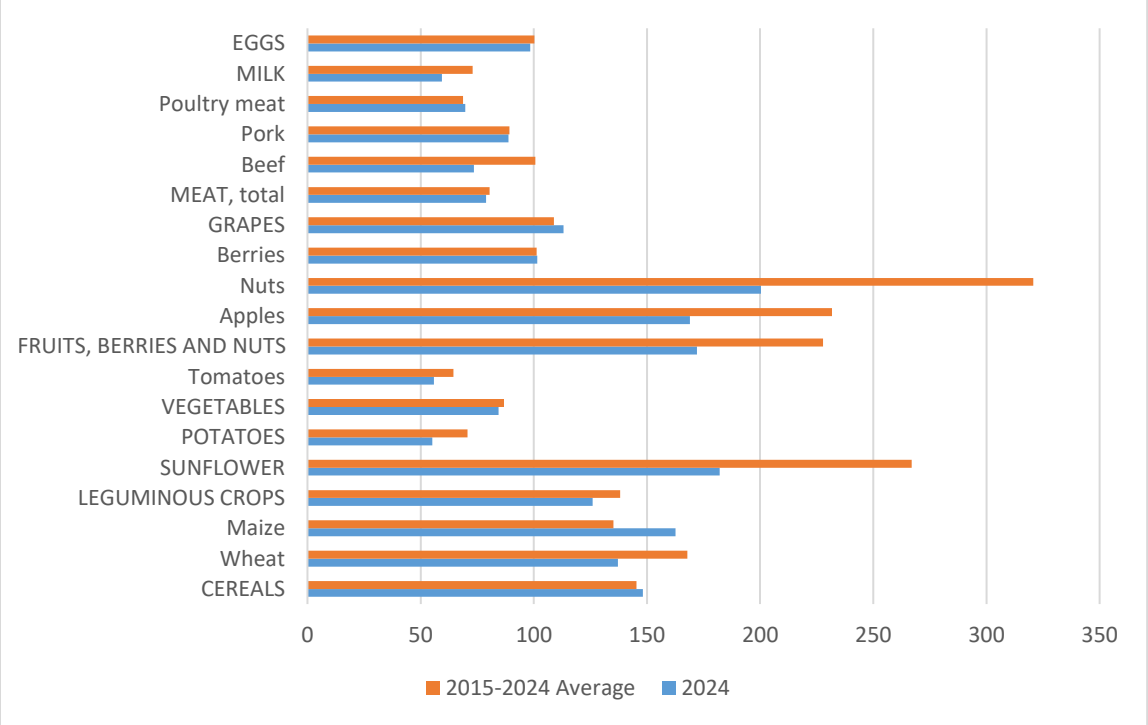

Figure 5. Self-sufficiency ratio of main agrifood products in the RM in 2015-2024, %

Source: National Bureau of Statistics of the RM [2], author's calculations

6. Discussion

The results of this study reveal a structurally dual agrifood system in the Republic of Moldova, characterized by strong export competitiveness in crop-based sectors alongside persistent weaknesses in livestock production and domestic food supply. This duality reflects deeper structural features of the agricultural production, including factor endowments, historical specialization patterns, and uneven investment across subsectors.

From a trade perspective, the consistently high self-sufficiency ratios and positive trade balances in cereals, oilseeds, and fruits confirm Moldova's revealed comparative advantage in primary agricultural commodities. However, this specialization is predominantly concentrated in low value-added segments of the value chain. While advantageous in terms of export revenues, such a structure limits the country's capacity to capture higher margins associated with processing and other activities augmenting the value-added. Moreover, the high concentration of some key agrifood products exports, as indicated by the Herfindahl–Hirschman Index, suggests that Moldova remains exposed to external shocks, including price volatility and demand fluctuations in key partner markets.

In contrast, the persistently low self-sufficiency ratios observed in livestock products, especially milk and meat, highlight the weaknesses associated to these subsectors. These are likely driven by a combination of structural constraints, including fragmented farm structures, low productivity levels, limited access to modern technologies, and insufficient integration into formal value chains. The declining trend in livestock production further reinforces the interpretation that these are not short-term fluctuations but rather long-term structural weaknesses.

Mirror statistics analysis for some key products reveals discrepancies between reported exports and partner-country imports. These inconsistencies point to potential issues such as re-export activities, differences in statistical methodologies, not accurate or underreporting by entities. This underscores the need for improved data harmonization and institutional coordination in statistical systems, as reliable data are essential for informed decision-making.

The coexistence of surplus production in crop sectors and deficits in livestock products raises important questions regarding food security and economic resilience. While export-oriented agriculture contributes favorably to the trade balance, reliance on imports for some essential food categories increases vulnerability to external disruptions, including supply chain shocks and geopolitical risks. This vulnerability has become particularly relevant in the context of global and regional crises, which have exposed the fragility of international food systems. Addressing these structural imbalances requires a comprehensive and targeted policy approach. First, increasing investment in livestock production is critical, particularly in areas such as farm consolidation, genetic improvement, feed efficiency. Second, shift focus to high-value added crop farming (such as fruits, nuts, berries, vegetables, herbs& medicinal plants) and organic production to increase income for farmers. In addition, the use of advanced methods and technologies for farming, adapted to climate changes will be of great importance to ensure sustainable agricultural production. A better integration of livestock and crop sectors is key for ensuring climate change mitigation benefits. Improvement in agriculture land management, such as conservation agriculture and improved pastures, will contribute to improved resilience and to climate change mitigation.

Third, the development of agro-processing industries would enable Moldova to move up the value chain, increasing domestic production of high value-added goods and reducing dependence on raw commodity exports. Increased investments in local processing facilities and establishment of short value chains, strengthening the connection between farming and manufacturing would contribute to the development and improved profitability of the agrifood system.

Forth, improving infrastructure, particularly storage, cold chains, and logistics would enhance market integration and reduce post-harvest losses. Fifth, there is a need to diversify products and export markets to reduce reliance on vulnerable, traditional markets and intensify compliance with EU quality standards to access high-value EU markets.

Moldova's Association Agreement with the EU (of which the Deep and Comprehensive Free Trade Area (DCFTA) part entered into force in 2016) is an important milestone that has provided exporters with improved access to the EU single market and should be used for further extension of Moldovan export to the EU. Experience from other countries shows that EU accession can bring significant economic benefits, including improved quality of goods according to the EU standards, faster export growth, higher foreign direct investment, and greater access to capital and technology [5].

Furthermore, strengthening institutional capacity and statistical systems is essential for improving data quality and ensuring consistency between national and international datasets. Enhanced data integration would not only improve data accuracy, availability and user-friendly access to statistical data and metadata, but also support more effective policy design and evaluation.

Table 2 illustrates some suggestions to decision makers related to strengthening Moldova's agrifood system.

Table 2. Policy framework for strengthening Moldova's agrifood system

Priority Level	Policy Area	Specific Measures	Expected Impact	Time Horizon
High	Livestock sector development	- Subsidies for herd modernization - Genetic improvement programs - Access to veterinary services	- Increase domestic production of milk and meat - Reduce import dependency - Improve food security	Medium-term (3–5 years)
High	Crop production development	- Shift focus to high-value added farming - Use of advanced methods and technologies for crop production adapted to climate changes, to	- Improve the stability of agricultural production	Medium-term (3–5 years)

Priority Level	Policy Area	Specific Measures	Expected Impact	Time Horizon
		support sustainable agricultural production, such as: Integrated Pest Management (IPM); use of Anti-erosion and Soil Conservation Techniques; Efficient Water Management - Enhance farmers literacy to improve the crop production structure, increase yields while safeguarding the ecosystem - State support for promoting high-value added and sustainable agricultural and agrifood production	- Increase domestic production of high-value added crops - Reduce the impact of agriculture on the ecosystem - Improve food safety and security	
High	Organic production	- State support and promotion of organic production - Promotion of consumption of certified organic products among users - Strengthening capacities of state authorities to monitor/observe and product safety control	- Improve the quality of agricultural products - Increase production and export of high-value organic products - Improve food safety and security	Long-term (4–7 years)
High	Agro-processing & Value chains	- State support for food processing industries - Incentives for private investment - Integration of farmers into agro-processing activities and supply chains	- Increase value-added exports - Reduce reliance on raw commodity exports - Improve competitiveness	Medium-term (3–5 years)
Medium	Infrastructure development	- Cold storage systems - Transport and logistics improvements	- Reduce losses	Medium-term (2–4 years)

Priority Level	Policy Area	Specific Measures	Expected Impact	Time Horizon
		- Post-harvest handling facilities	- Stabilize supply - Improve products quality and extend value-added exports	
Medium	Export diversification	- Promotion of new markets - Trade agreements support - Product and destination diversification strategies - Urgent adaptation to EU quality standards for better market access	- Improve resilience of export structure - Reduce exposure to external shocks	Long-term (4–7 years)
Low	Statistical system development and integration	- Harmonization of trade and production data - Integration mirror statistics into regular statistical activity - Integration of statistics and spatial data - Improve statistical dissemination, e.g. through extended use of Geographic Information Systems (GIS) tools and visualization products - Launching of the International Trade Statistics Platform my the NBS.	- Improve data reliability - Enhance data dissemination - Support evidence-based policymaking	Short-term (1–3 years)

7. Conclusions

Agriculture continues to play a strategic role in the Republic of Moldova, despite a gradual decline in its contribution to gross domestic product. Moldova's agricultural sector is highly exposed to climate shocks, resulting in significant reduction of crop productivity and farm income. The fragmentation of agricultural farming, especially in livestock sector has also a negative impact on agricultural production and resilience.

The results of this study reveal a structural duality in Moldova's agrifood system. On the one hand, the country demonstrates strong competitiveness in crop-based production and exports. On the other hand, it faces persistent weaknesses in livestock

production and food processing, as well as dependence on imports for some essential food categories. RCA analysis confirms Moldova's comparative advantage in crop-based exports, while HHI indicate high market concentration and reliance on few markets for a number of key agrifood products, suggesting vulnerability to external shocks such as price fluctuations and trade disruptions.

The findings of this study reflect a classic development pattern observed in transition economies, where comparative advantage is concentrated in primary production while downstream sectors remain underdeveloped. Moving beyond this pattern requires structural transformation, supported by coordinated policies that promote diversification, technological upgrading, and value chain integration. In its turn, enhancing statistical systems and data integration will support informed decisions through improved reliability and better access to high quality data and metadata.

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