


# Food Safety and Local Competitiveness: Challenges and Opportunities for Producers in Moldova

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## Abstract

This article examines the impact of food safety regulations on the competitiveness of local producers in the Republic of Moldova, a country heavily reliant on its agricultural sector. With food security remaining a critical issue due to challenges such as limited arable land, drought vulnerability, and dependence on food imports, Moldova's alignment with national and international standards, including EU directives and Codex Alimentarius, imposes both opportunities and constraints. The study analyzes how compliance with stringent regulations affects small and medium-sized producers, who dominate the agricultural landscape, through increased costs and technological demands. Simultaneously, it explores how adherence to these standards enhances market access and consumer trust, fostering innovation and modernization. Drawing on systemic, institutional, and comprehensive methodological approaches, the article identifies strategies to balance food safety requirements with the need to support local producers' competitiveness. Recommendations include targeted government support, collaborative initiatives, and improved access to financing to ensure sustainable development in Moldova's agri-food sector.

## Keywords

Food Safety, Local Producers, Agricultural Sector, EU Standards

## 1. Introduction

Food safety is a global and national priority, playing a critical role in protecting consumer health and building trust in agri-food products. In the Republic of Mol-

dova, a country with an economy significantly reliant on the agricultural sector, ensuring food safety is crucial for sustainable development and integration into international markets, particularly in the context of the Association Agreement with the European Union [1]. According to the Food and Agriculture Organization of the United Nations (FAO), Moldova is among the Eastern European countries where food security remains vulnerable, requiring a systemic approach to risk management and adaptation to new conditions for the development of the agricultural sector [2]. Furthermore, a joint FAO and WFP report [3] indicates that approximately 16% of Moldova's population experiences moderate or severe food insecurity, with 80% of them residing in rural areas. Analysis by Dinu *et al.* [4] reveals that over 60% of households depend on their own agricultural production or subsidies, highlighting the low resilience of food security. The Ministry of Agriculture and Food Industry of the Republic of Moldova identifies key challenges threatening food security, including the reduction of arable land, vulnerability to droughts and inadequate irrigation infrastructure, low levels of technological advancement in agriculture, and high dependence on imports for certain food products [5]. Strict food safety regulations, while necessary, can pose challenges for local producers, especially small and medium-sized ones, who face limited resources. At the same time, these regulations offer opportunities for modernization and access to competitive markets, contributing to the improved quality of Moldovan products [6]. Food safety regulations in the Republic of Moldova align with both national standards, overseen by the National Agency for Food Safety [7], and international requirements, such as those of the European Union and the Codex Alimentarius. National legislation, such as Law No. 306/2018 on food safety, establishes stringent standards for production, processing, and marketing, including requirements for hygiene, traceability, and certification. At the international level, integration into the European economic area entails compliance with EU directives that promote high consumer protection standards. While essential for ensuring quality, these regulations require significant investments from producers, impacting their competitiveness [8]. Modern research on food security relies on diverse methodological approaches. The systemic approach allows food security to be viewed as the result of interactions among various elements of the agri-food system. The institutional approach emphasizes the role of institutions and the regulatory framework in ensuring food security. The comprehensive approach integrates various methods and tools for a holistic analysis of food security. Today, the concept of food security is interpreted multidimensionally, encompassing not only the physical and economic accessibility of food but also its quality, the sustainability of production systems, and environmental safety. This article aims to analyze the impact of food safety regulations on local producers in the Republic of Moldova, focusing on how these regulations affect their competitiveness in domestic and international markets. By examining the challenges and opportunities created by compliance with standards, the study highlights strategies to support local producers in the context of food safety requirements.

## 2. Materials and Methods

The study does not combine primary qualitative and quantitative data collection. Instead, it employs a comprehensive policy analysis and structured literature review, consisting of: a systematic review of regulatory documents, including national legislation, EU regulations, and international standards related to food safety; a structured literature review of scientific and grey literature relevant to the impact of food-safety regulations on producers; comparative policy analysis, used to contrast Moldova's regulatory framework with EU and regional practices; analytical synthesis, integrating findings from the policy and literature review to identify key patterns, constraints, and competitiveness implications. The following base legislative documents and information were used: Official reports and legislative documents from the National Agency for Food Safety [7] and the Ministry of Agriculture and Food Industry, including Law No. 306/2018 on Food Safety and the National Food Security Strategy [9]; International standards and guidelines from the Codex Alimentarius Commission [10], including the General Principles of Food Hygiene and HACCP framework, and EU regulations such as Regulation (EC) No. 178/2002 (general food law) and Regulation (EC) No. 853/2004 (food hygiene); Statistical data from the National Bureau of Statistics of Moldova [11] on agricultural production, export volumes, and food import dependency; Academic literature, including studies by Popa & Ciobanu [12] and Moroz & Stratan [8], to provide context for the regulatory framework and its economic implications. This approach was employed to assess the interactions between food safety regulations, production processes, and market dynamics within Moldova's agri-food system. It involved mapping key stakeholders (producers, regulators, and consumers) and analyzing their roles in ensuring food safety and enhancing competitiveness.

## 3. Results and Discussions

### 3.1. Overview of Key National and International Food Safety Regulations

The Republic of Moldova, as a country striving for integration into the European economic space, has developed a robust framework of food safety regulations aligned with both national legislation and international standards, such as those set by the European Union (EU) and the Codex Alimentarius. These regulations aim to ensure consumer safety, enhance product quality, and facilitate access to global markets, while also posing challenges for local producers in terms of compliance costs and technological adaptation. In Moldova, food safety is primarily governed by Law No. 306/2018 on Food Safety, which establishes comprehensive requirements for the production, processing, and distribution of food products. This law emphasizes hygiene standards, traceability, and certification to protect public health and align with international norms. The National Agency for Food Safety [7] oversees the implementation and enforcement of these regulations, conducting inspections and ensuring compliance across the food supply chain. Addi-

tionally, the National Food Security Strategy (2023), developed by the Ministry of Agriculture and Food Industry, addresses systemic challenges such as drought vulnerability and limited irrigation infrastructure, aiming to strengthen food security while supporting local producers [13]. These national regulations are designed to harmonize with international standards, particularly in the context of Moldova's Association Agreement with the EU. On the international level, Moldova adheres to the standards of the Codex Alimentarius, a collection of guidelines, codes of practice, and standards established by the Food and Agriculture Organization [1] and the World Health Organization [14]. The Codex sets benchmarks for food hygiene, additives, pesticide residues, and labeling, serving as a reference for international trade disputes under the World Trade Organization [10] [14]. For instance, the Codex's General Principles of Food Hygiene and HACCP (Hazard Analysis and Critical Control Points) framework are widely adopted to ensure food safety across production stages [10]. Moldova's integration into the EU market is guided by compliance with EU food safety regulations, notably Regulation No. 178/2002 [15], which establishes general principles and requirements for food law, including traceability and the role of the European Food Safety Authority [16]. Other key EU regulations include Regulation No. 852/2004 on food hygiene [17] and Regulation No. 1169/2011 on food labeling [18], which mandate strict controls on contaminants, additives, and transparent consumer information (European Commission, 2023). These standards require Moldovan producers to invest in modern technologies and certification processes to access EU markets, often straining small and medium-sized enterprises (SMEs) that dominate the sector [8].

While national and international regulations ensure high standards of food safety, they present significant challenges for Moldovan producers, particularly SMEs, which account for approximately 90% of the agricultural sector [6]. Compliance costs, including investments in infrastructure and training, can limit competitiveness. However, adherence to these standards also opens opportunities for market expansion, increased consumer trust, and alignment with global sustainability goals, such as the UN's Sustainable Development Goal 2: Zero Hunger.

### **3.2. General Characteristics of the State of Food Security in Moldova**

Modern food security research relies on diverse methodological approaches. The systemic approach views food security as the result of interactions among various elements of the agri-food system. The institutional approach emphasizes the role of institutions and the regulatory framework in ensuring food security. The comprehensive approach integrates various methods and tools for a holistic analysis of food security. Today, the concept of food security is interpreted multidimensionally, encompassing not only the physical and economic accessibility of food but also its quality, the sustainability of production systems, and environmental safety. Contemporary approaches highlight the importance of not only ensuring caloric intake but also upholding human rights to a decent life, equitable resource

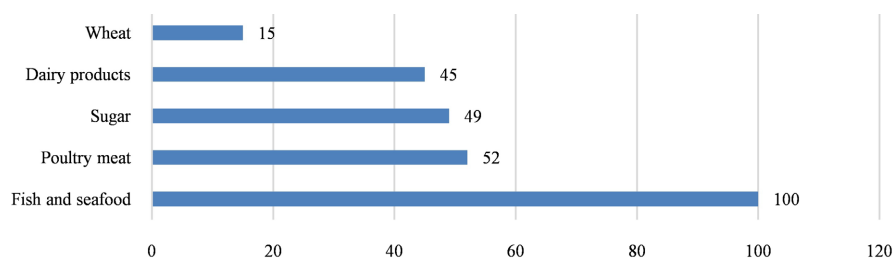
distribution, and consideration of cultural dietary preferences. a) Multi-level Structure of Food Security: Modern interpretations are based on four key pillars outlined in documents by the Food and Agriculture Organization of the United Nations [19]. b) Food Security and Sustainability: A New Paradigm: Over the past two decades, researchers have shifted focus toward sustainable food systems. As noted by Maxwell and Slater [20], achieving food security is impossible without considering ecosystem boundaries, agrobiodiversity, and equitable resource allocation. The concept of food sovereignty, introduced by “La Via Campesina” movement, has also influenced interpretations. It emphasizes the rights of local communities to determine their own production systems, in contrast to globalized agricultural supply chains [21]. c) Food Security as a Human Right: United Nations documents, including the Global Strategy on Food Security and Nutrition [22], underscore that food security is not merely a policy issue but an inalienable human right. This is also reflected in Article 11 of the International Covenant on Economic, Social, and Cultural Rights [23]. d) Environmental and Climatic Aspects: In the context of climate change, food security is increasingly viewed through the lens of environmental sustainability. According to Sarangi *et al.* [24], sustainable agricultural systems, localized food production, and the reduction of food losses are key components of modern food security. Food security is influenced by numerous factors, including the efficiency of the agri-food system, economic stability, climate change, and political conditions. Research emphasizes the importance of adapting agri-food systems to changing conditions and the need to develop sustainable development strategies. Ensuring food security amidst global challenges—such as climate change, population growth, natural resource depletion, pandemics, and armed conflicts—has become a priority for the state policies of most countries worldwide. International experience demonstrates that an effective food security system is built on a comprehensive approach that integrates social, economic, environmental, and technological measures. Particular emphasis is placed on the sustainability of agri-food systems, food accessibility for vulnerable populations, and support for local production. A prominent example is the European Union, where food security is ensured through the Common Agricultural Policy (CAP). This system not only supports farmers but also promotes the greening of agriculture, sustainable use of natural resources, development of local markets, and the adoption of innovative agrotechnologies. In recent years, the EU has focused on reducing food losses and waste, combating food inequality, and strengthening food system resilience under the Farm to Fork Strategy [25]. In Brazil, the large-scale Fome Zero (Zero Hunger) program has combined social support measures, school feeding initiatives, financing for family farms, and food access for low-income populations. This program significantly reduced malnutrition levels and has served as a model for several Latin American countries [26]. Israel, despite limited water and land resources, has developed one of the most effective food security systems. The country has implemented advanced irrigation technologies, biotechnologies, and targeted food assistance mechanisms for vulnerable populations [27]. China prioritizes food self-sufficiency as a component

of national security. The state actively supports domestic grain production, maintains strategic food reserves, and promotes agricultural innovations, including digital platforms and precision farming. Additionally, China implements large-scale campaigns to combat food waste and unsustainable consumption [28]. India has developed a unique model of state-supported food security through the Public Distribution System [29], serving hundreds of millions of citizens. This system was complemented by the National Food Security Act, which enshrines the right of every citizen to access a basic set of food products. Digitalization has made the system more transparent and efficient. In the context of acute water and land resource scarcity, Israel has achieved remarkable results through advanced agricultural technologies, including drip irrigation, greenhouse complexes, the use of treated wastewater, bioengineering, and smart farm management systems. These innovations have enabled the country to meet domestic needs and become an exporter of food security technologies [30]. African countries, supported by international organizations such as the FAO, World Bank, and World Food Programme (WFP), are implementing regional initiatives focused on sustainable agriculture, support for women farmers, climate adaptation, and combating acute hunger. A notable example is the Comprehensive Africa Agriculture Development Programme (CAADP), aimed at modernizing the agricultural sector. Thus, international experience demonstrates that food security encompasses not only the availability of sufficient food but also a system of effective management, sustainable production, social support, innovative development, and international cooperation. Adapting these approaches to national conditions can significantly enhance the resilience of the Republic of Moldova's food system, ensuring its population has access to safe and high-quality food. Food security is a key element of a country's sustainable development. According to the FAO definition [19], food security is achieved when all people, at all times, have physical, social, and economic access to sufficient, safe, and nutritious food. The Republic of Moldova, as an agrarian country, has the potential for self-sufficiency but faces numerous internal and external challenges. Moldova benefits from favorable agro-climatic conditions. However, as noted by Cebotari & Chiriac [11] [31], agriculture remains vulnerable to climate change, soil degradation, and limited access to modern technologies (Table 1).

**Table 1.** Dynamics of agricultural production.

| Indicator                     | Change in 2023 Compared to 2022 |
|-------------------------------|---------------------------------|
| Total agricultural production | +23.6%                          |
| Crop production               | +35.1%                          |
| Livestock production          | -1.9%                           |

Approximately 75% of food is provided through domestic production, with the remainder met by imports (Figure 1).



**Figure 1.** Share of imports in Moldova (%).

According to the Ministry of Agriculture and Food Industry [32], Moldova is heavily dependent on imports of cereals, sugar, dairy products, poultry, and fish. This dependency makes the country susceptible to external price shocks, particularly during global crises (e.g., the COVID-19 pandemic and the war in Ukraine) (Tables 2-4).

**Table 2.** Yield of major crops.

| Crop       | Yield (Tons/ha) | Change in 2023 Compared to 2022 |
|------------|-----------------|---------------------------------|
| Wheat      | 4.12            | +61.6%                          |
| Barley     | 4.10            | +66.7%                          |
| Sugar beet | 38.54           | +180%                           |
| Vegetables | 16.68           | +30%                            |

**Table 3.** Decline in livestock numbers.

| Animal Type          | Population (Thousands) | Change in 2023 Compared to 2022 |
|----------------------|------------------------|---------------------------------|
| Cattle               | 104                    | -3.3%                           |
| Pigs                 | 369.6                  | -6.8%                           |
| Sheep and goats      | 570.2                  | -6.1%                           |
| Poultry (industrial) | 4,600                  | -5.5%                           |

**Table 4.** Levels and food vulnerability.

| Indicator                    | Value (2024)          |
|------------------------------|-----------------------|
| Poverty level                | 31% of the population |
| Number of Ukrainian refugees | 123,000 people        |
| Country population           | 2.4 million people    |

According to the National Bureau of Statistics [33], more than 25% of households spend over half their income on food. Research by Bivol & Ungureanu [34] indicates that low incomes and high poverty levels significantly limit access to adequate nutrition, particularly in rural areas.

Moldova has implemented elements of the HACCP system and is aligning vet-

erinary and phytosanitary standards with EU requirements [32]. However, as noted by Duca & Cazac [35], there are shortcomings in quality control during production and processing, particularly among small producers. In 2023, the new Strategy for Rural Development and Food Security of the Republic of Moldova until 2030 was approved. Its priorities include: sustainable agricultural production; increasing productivity and agricultural innovation; developing storage and processing infrastructure; improving product quality and safety. Studies by Popa and Ciobanu [36] indicate that rising temperatures and changing precipitation patterns are already affecting crop yields, particularly for maize and wheat, threatening the stability of food supply. Government programs exist to support vulnerable populations, but, as Jardan & Ursu [37] argue, they often fail to effectively reach those most in need (Table 5).

**Table 5.** Level of food insecurity in Moldova.

| Indicator                                      | Value (WFP/FAO, 2022)              |
|--|------------------------------------|
| Population with moderate and severe insecurity | 16%                                |
| Rural population at risk                       | 80% of the insecure                |
| Food price increase (2021-2022)                | 25% - 40%                          |
| Share of household expenditure on food         | 43% (one of the highest in Europe) |

The Republic of Moldova has significant potential to strengthen its food security. However, this requires enhancing agricultural resilience, improving social support systems, and adapting national policies to climatic and economic challenges. Cooperation with the EU and international organizations offers opportunities to attract investment and elevate food safety standards. The food security of the Republic of Moldova has remained vulnerable in recent years across several key indicators. According to data from the National Bureau of Statistics and the World Food Programme, despite relatively high levels of physical food availability, significant challenges persist in economic and nutritional accessibility. The Global Food Security Index (GFSI) ranks Moldova low compared to neighboring countries, indicating the need for further development of agricultural policies aimed at reducing import dependency and enhancing agricultural resilience. One of the primary causes of food supply instability is the vulnerability of agriculture, which is heavily dependent on weather conditions. Moldova faces an increasing frequency of droughts, negatively impacting the yields of major agricultural crops. Over recent years, yields of wheat, maize, and sunflower have varied significantly due to weather conditions (Table 6).

**Table 6.** Yields of key crops in 2018-2023 (quintals/ha).

| Year | Wheat | Maize | Sunflower |
|------|-------|-------|-----------|
| 2018 | 33    | 45    | 23        |
| 2019 | 34    | 48    | 25        |

**Continued**

|      |    |    |    |
|------|----|----|----|
| 2020 | 22 | 31 | 17 |
| 2021 | 36 | 52 | 26 |
| 2022 | 30 | 40 | 21 |
| 2023 | 28 | 38 | 20 |

The decline in yields in 2020 and 2022 was associated with prolonged droughts, underscoring the need for sustainable agricultural technologies and the development of irrigation systems. Rising food prices remain a significant barrier to ensuring food accessibility for the population. In 2022, food inflation in Moldova exceeded 30%, reducing purchasing power and increasing poverty levels among the population. Research indicates that approximately 23% of households face difficulties in securing a minimum nutritional diet, highlighting the need for government support for vulnerable groups. Despite the potential of agriculture, Moldova's self-sufficiency in many food categories remains low. This is particularly true for meat, dairy products, and vegetables, which are often imported, making the country vulnerable to external economic shocks. For example, Moldova has a high dependency on imports of poultry meat and agricultural seed materials. Addressing current food security challenges in Moldova requires the comprehensive adoption of innovative solutions and strategies. Key recommendations include: A critical priority is the implementation of sustainable agricultural technologies, such as drip irrigation and water-saving systems, to significantly reduce risks associated with droughts and other climatic anomalies. Government subsidies for agricultural risk insurance are also vital to alleviate the financial burden on farmers during adverse weather conditions. Moldova needs to develop local food supply chains to reduce import dependency and enhance resilience to external economic shocks. This can be achieved through the creation of local agricultural cooperatives, improvements in storage and processing infrastructure, and the adoption of digital technologies in the agricultural sector to enhance logistics and production efficiency. The implementation of social support programs aimed at improving food accessibility for low-income populations is essential. Expanding school feeding programs, providing direct subsidies to low-income families, and launching educational campaigns on food literacy will help reduce food insecurity in the country. For sustainable food security by 2030, strengthened cross-sectoral collaboration between government agencies, agricultural businesses, research institutions, and international organizations is necessary. Continued efforts to improve infrastructure and adopt innovative solutions will enable Moldova not only to ensure food security but also to become a regional leader in agricultural production and processing. Thus, the analysis of the current state of food security in the Republic of Moldova reveals significant challenges. However, implementing comprehensive solutions focused on developing sustainable agriculture, localizing food supply chains, and supporting vulnerable populations can significantly improve the situation and ensure long-term food security. In conclusion, although

Moldova faces unique challenges in the food security landscape, examining different international food security models reveals key lessons that can be adapted to improve local strategies. By integrating best practices, such as specific features of the model, for example, diversified agricultural practices, sustainable resource management, or community initiatives, the Republic of Moldova can strengthen its resilience against food insecurity and improve the overall well-being of its population.

### **3.3. Role of Moldovan Institutions in Implementing and Monitoring Food Safety Regulations**

In 2005, the Moldovan government and the European Union agreed on an action plan for the promotion of efficient policy harmonization aimed at future integration. Since then, the Moldovan government has undertaken actions to adopt legislation related to agriculture and food safety in conformity with European laws. As part of this legislative transition, Moldova's food standards and regulations will mostly align with European food hygiene requirements. According to the National Food Safety Agency (NFSA), as of 2019, around 830 European (CEN) and international (ISO) standards have been adopted by the Moldovan food sector, of which 523 are CEN standards. At the governmental policy level, harmonization of food safety regulation is advancing steadily. However, at the field level, actors such as farmers and food industries tend to follow previous GOST standards due to their familiarity. Awareness-building activities for food business operators conducted through audits by NFSA subdivision staff are therefore necessary to advance the implementation of the new standards. Moldovan institutions play a pivotal role in ensuring compliance with food safety regulations, facilitating the alignment of the agri-food sector with national and international standards, and supporting local producers in maintaining competitiveness. The National Agency for Food Safety [7] is the primary institution responsible for implementing and monitoring food safety norms in the Republic of Moldova. Established under Law No. 306/2018 on Food Safety, ANSA oversees the entire food supply chain, from production to distribution, ensuring adherence to hygiene, traceability, and quality standards [9]. Its responsibilities include conducting regular inspections, issuing certifications, and enforcing compliance with both national legislation and international frameworks, such as the Codex Alimentarius and EU regulations (e.g., Regulation (EC) No. 178/2002 and Regulation (EC) No. 852/2004). ANSA collaborates with the Ministry of Agriculture and Food Industry, which develops strategic policies, such as the National Food Security Strategy [9], to address systemic challenges like drought vulnerability and limited technological adoption in agriculture [13]. The Ministry also facilitates training programs and subsidies to help small and medium-sized enterprises (SMEs), which constitute approximately 90% of Moldova's agricultural sector, meet regulatory requirements [12]. Additionally, the National Bureau of Statistics provides critical data on production and trade, enabling evidence-based policy decisions to strengthen food safety and market

access. These institutions face challenges, including limited funding and technical capacity, which can hinder effective monitoring and support for producers. However, their efforts to harmonize national standards with EU requirements have opened opportunities for Moldovan producers to access international markets, enhancing competitiveness while ensuring consumer safety [8] [38] [39]. Through inspections, certifications, and capacity-building initiatives, ANSA and other institutions are instrumental in balancing regulatory compliance with the economic needs of local producers.

### 3.4. Alignment with EU Standards

The integration of the Republic of Moldova into the European economic space, particularly through the Association Agreement with the European Union (EU) signed in 2014, has significantly shaped its food safety standards, aligning them with rigorous EU regulations to enhance consumer protection and facilitate access to international markets. This process has both driven modernization in the agri-food sector and posed challenges for local producers, particularly small and medium-sized enterprises (SMEs), which dominate Moldova's agricultural landscape. European integration has necessitated the adoption of key EU food safety regulations, such as Regulation (EC) No. 178/2002, which establishes the general principles of food law, including traceability and risk management, and Regulation (EC) No. 852/2004, which sets stringent hygiene requirements for food production and processing (European Commission, 2023). Additionally, Regulation (EU) No. 1169/2011 on food labeling mandates clear and accurate consumer information, ensuring transparency across the supply chain. Moldova has harmonized its national legislation, notably Law No. 306/2018 on Food Safety, with these EU directives to meet the requirements of the Deep and Comprehensive Free Trade Area (DCFTA). This alignment is overseen by the National Agency for Food Safety (ANSA), which conducts inspections and certifications to ensure compliance (ANSA, 2023). The adoption of EU standards has opened significant opportunities for Moldovan producers. Compliance with these regulations enhances the credibility of Moldovan products, enabling access to the EU market, which accounts for a growing share of Moldova's agri-food exports (approximately 65% in 2023, according to the National Bureau of Statistics, 2023). For instance, products like wine, fruits, and processed foods have gained recognition in EU markets due to improved quality and safety standards [8]. Furthermore, European integration encourages technological modernization and innovation, as producers invest in advanced equipment and training to meet certification requirements. This aligns with the National Food Security Strategy (2023), which emphasizes sustainable development and competitiveness in the agri-food sector [13]. Additionally, the transition to EU standards requires technical expertise and training, which are often inaccessible in rural areas. The pressure to compete with imported EU products, which benefit from economies of scale and established compliance systems, further threatens local producers' competitiveness [4]. The

impact of European integration extends beyond technical compliance, influencing Moldova's broader food security framework. By aligning with EU standards, Moldova strengthens consumer trust and reduces health risks, contributing to the United Nations Sustainable Development Goal 2: Zero Hunger. However, the government must address the challenges faced by SMEs through targeted support, such as subsidies, training programs, and access to affordable financing, to ensure that the benefits of integration are equitably distributed across the agri-food sector.

### **3.5. Challenges for Local Producers: Costs of Compliance with Regulations**

Compliance with food safety regulations presents significant challenges for local producers in the Republic of Moldova, particularly for small and medium-sized enterprises (SMEs), which account for approximately 90% of the agricultural sector [12]. The financial and operational burdens associated with meeting national and international standards, such as Law No. 306/2018 on Food Safety, Codex Alimentarius, and EU regulations [17], often strain the limited resources of these producers, impacting their competitiveness in domestic and international markets. Adhering to food safety standards requires substantial investments in infrastructure, such as modernized production facilities, refrigeration systems, and sanitation equipment. For instance, compliance with the HACCP (Hazard Analysis and Critical Control Points) framework necessitates specialized equipment to monitor and control critical points in the production process [10]. Obtaining certifications, such as those required for EU market access or compliance with national standards overseen by the National Agency for Food Safety (ANSA), involves significant expenses. These include fees for laboratory testing, audits, and certification processes, as well as ongoing costs for maintaining compliance. For example, certification for organic products or compliance with EU labeling standards [18] requires regular third-party inspections, which can cost SMEs thousands of euros annually (European Commission, 2023). The 2024 survey revealed that 70% of small producers cited certification costs as a major barrier to expanding into international markets [11]. Regular inspections and monitoring by ANSA to ensure compliance with food safety regulations add further financial and administrative burdens. Producers must allocate resources for staff training, documentation, and compliance audits, which can divert funds from other critical areas such as marketing or product development. The National Food Security Strategy (2023) notes that frequent inspections, while essential for consumer safety, can disproportionately affect small producers who lack dedicated compliance teams [5]. Additionally, non-compliance penalties, which can range from fines to temporary suspension of operations, pose a significant risk for SMEs with limited financial resilience. The high costs of compliance exacerbate the challenges faced by local producers, particularly in rural areas where access to financing and technical expertise is limited. These financial pressures can lead to reduced profitabil-

ity, market exclusion, or reliance on lower-cost, non-compliant practices, undermining both food safety and competitiveness [8]. Addressing these challenges requires targeted support, such as subsidies, affordable credit, and training programs, to enable local producers to meet regulatory standards without compromising their economic viability. Small producers of the agricultural sector in the Republic of Moldova face significant challenges due to limited access to financial and technological resources, which hinders their ability to comply with stringent food safety regulations and maintain competitiveness [12]. These constraints exacerbate the difficulties of aligning with national standards, such as Law No. 306/2018 on Food Safety, and international frameworks, including the Codex Alimentarius and EU regulations (e.g., Regulation (EC) No. 852/2004 on food hygiene), impacting their market presence both domestically and internationally. Small producers often lack the capital required to meet the costs associated with food safety compliance, such as upgrading production facilities, obtaining certifications, and implementing HACCP (Hazard Analysis and Critical Control Points) systems. The National Food Security Strategy (2023) highlights that limited government subsidies and inadequate financial support programs further restrict small producers' ability to invest in compliance-related infrastructure, such as modern storage or processing equipment (Ministry of Agriculture and Food Industry, 2023). This financial barrier often forces small producers to prioritize short-term survival over long-term investments, reducing their competitiveness against larger firms or imported products. Access to modern technologies, such as automated processing systems, advanced irrigation, or laboratory testing equipment, is critical for meeting food safety standards and improving productivity. However, small producers, particularly in rural areas, face significant technological gaps. According to the National Bureau of Statistics (2023), only 15% of small agricultural enterprises in Moldova use advanced technologies, compared to 60% of large-scale producers. The high cost of equipment, coupled with limited technical expertise and training opportunities, restricts small producers' ability to implement systems like HACCP or comply with EU labeling requirements [18]. Additionally, poor rural infrastructure, such as unreliable electricity or internet access, further limits the adoption of digital tools for compliance monitoring or market engagement [8]. The lack of financial and technological resources creates a vicious cycle for small producers, as they struggle to meet regulatory standards, access premium markets (e.g., the EU), or compete with imported goods that benefit from economies of scale. This vulnerability is particularly pronounced in rural areas, where 80% of Moldova's food-insecure population resides, and many households rely on subsistence farming [14]. Without adequate resources, small producers risk being excluded from high-value markets, perpetuating economic disparities and undermining food security objectives. Addressing these challenges requires targeted interventions, such as expanding access to low-interest loans, microfinance programs, and government subsidies tailored to small producers. Additionally, partnerships with international organizations, such as the FAO, could

facilitate technology transfers and training programs to bridge the technological gap. The National Food Security Strategy (2023) emphasizes the need for such initiatives to enhance the resilience and competitiveness of small producers while ensuring compliance with food safety standards [5].

### **3.6. Government Support: Subsidies, Training Programs, and Access to Financing**

Agri-food security is an essential constituent of the national security of the Republic of Moldova, one of the most critical components of the demographic policy and the life support system, and a necessary condition for maintaining health. Government support is critical for enabling local producers in the Republic of Moldova, particularly small and medium-sized enterprises (SMEs), to comply with stringent food safety regulations and enhance their competitiveness in domestic and international markets. Through subsidies, training programs, and improved access to financing, the Moldovan government aims to mitigate the challenges posed by compliance costs and resource limitations, fostering sustainable development in the agri-food sector. Subsidies are a key mechanism to alleviate the financial burden of compliance with food safety standards, such as Law No. 306/2018 on Food Safety and EU regulations [7]. The Ministry of Agriculture and Food Industry administers programs like the National Fund for Agricultural and Rural Development, which provides grants for infrastructure upgrades, such as modernized processing facilities and HACCP-compliant equipment (Ministry of Agriculture and Food Industry, 2023). In 2023, approximately 1,200 SMEs received subsidies covering up to 40% of investment costs for certification and technology adoption, though only 20% of eligible small producers accessed these funds due to bureaucratic barriers and limited awareness [11]. Expanding subsidy programs to target rural producers and simplifying application processes could further enhance compliance and competitiveness [4]. Training programs are essential for equipping producers with the knowledge and skills needed to meet national and international standards, such as the Codex Alimentarius and EU requirements [18]. The National Agency for Food Safety [9] collaborates with international partners, including the FAO, to offer workshops on HACCP implementation, hygiene practices, and certification processes [2]. In 2024, over 500 producers participated in ANSA-led training sessions, with 70% reporting improved understanding of regulatory requirements [9]. However, access remains limited in rural areas due to logistical challenges and insufficient outreach. Expanding mobile training units and online platforms could bridge this gap, enabling SMEs to adopt best practices and improve product quality [8]. The government, through initiatives like the Agricultural Credit Guarantee Fund, facilitates low-interest loans and microfinance programs to support infrastructure upgrades and certification costs. In 2023, this program supported 300 SMEs, but demand far exceeds available funds [13]. Partnerships with international donors, such as the EU and World Bank, have also provided credit lines for modernization, with €15 million

allocated in 2023 for agri-food projects [17]. Increasing funding allocations and streamlining loan access for small producers, particularly in rural areas, could enhance their ability to meet standards and compete in high-value markets. Government support through subsidies, training, and financing not only facilitates compliance but also strengthens Moldova's agri-food sector by promoting innovation and market access. These initiatives align with the National Food Security Strategy [9] and contribute to the United Nations Sustainable Development Goal 2: Zero Hunger by enhancing food security and producer resilience [13]. Continued investment in these areas, coupled with improved coordination and accessibility, is essential to ensure equitable benefits for SMEs and sustain Moldova's integration into global markets.

### 3.7. Opportunities Generated by Food Safety Regulations

Compliance with food safety regulations in the Republic of Moldova, driven by national legislation such as Law No. 306/2018 on Food Safety and international standards like the Codex Alimentarius and EU regulations [15] and Regulation [17], creates significant opportunities for local producers. These regulations, while challenging, foster consumer trust, enable access to international markets, and promote innovation and modernization in the agri-food sector, enhancing the competitiveness of Moldovan products. Adherence to stringent food safety standards significantly boosts consumer confidence in Moldovan agricultural products. Compliance with regulations ensures that products meet high-quality and safety benchmarks, addressing concerns about health risks and improving public perception. For instance, certifications such as those issued by the National Agency for Food Safety [7] or compliance with EU hygiene standards [17] signal reliability to consumers [17]. A 2024 survey of 123 Moldovan producers indicated that 68% reported increased domestic demand for certified products, particularly in urban markets like Chişinău, where consumers prioritize safety and quality [4]. This trust strengthens the market position of local producers, reducing reliance on imported goods and supporting food security objectives outlined in the National Food Security Strategy [13]. Alignment with international standards, particularly those required by the EU's Deep and Comprehensive Free Trade Area (DCFTA), enables Moldovan producers to access lucrative global markets. Compliance with EU regulations, such as Regulation [18] No. 1169/2011 on food labeling, allows products like wine, fruits, and processed foods to meet export requirements, with the EU accounting for 65% of Moldova's agri-food exports in [11]. For example, adherence to the HACCP framework has enabled producers to secure contracts with EU retailers, boosting export revenues [10]. This market access not only enhances economic returns but also aligns with Moldova's integration goals under the 2014 Association Agreement, fostering long-term competitiveness [8]. Food safety regulations drive technological advancements and modernization by incentivizing producers to adopt innovative practices to meet compliance requirements. Investments in modern equipment, such as automated processing systems or ad-

vanced irrigation technologies, are often necessary to comply with standards like HACCP or EU hygiene protocols. The National Food Security Strategy [9] highlights that such investments have led to a 20% increase in the adoption of modern technologies among compliant producers since 2020 [5]. Additionally, partnerships with international organizations, such as the FAO, have facilitated training programs and technology transfers, enabling small and medium-sized enterprises (SMEs) to improve efficiency and product quality [2]. These advancements contribute to sustainable development, aligning with the United Nations Sustainable Development Goal 2: Zero Hunger, and position Moldova's agri-food sector as a competitive player in global markets.

#### 4. Conclusions

To strengthen the practical relevance of the analysis and to support SMEs in the process of complying with food safety standards, the study proposes a series of operational measures adapted to the context of the Republic of Moldova. First, it is recommended to develop targeted compliance support programs, which may include subsidized vouchers for laboratory testing, standardized templates of HACCP plans adapted to micro-enterprises, and mobile technical assistance teams for training at the farm or processing unit level. Second, incentive schemes are needed to modernize food safety infrastructure, such as competitive mini-grants for the digitalization of traceability systems, the modernization of hygiene, and the implementation of monitoring tools. In addition, it is proposed to create structured collaboration platforms, such as regional food safety working groups, which would bring together producers, inspectors, and academic experts to develop common guidelines, harmonize regulatory interpretations, and identify emerging issues. Adopting a food safety framework—one that combines strong regulations with proportionate support mechanisms—has the potential to accelerate the transformation of the agri-food sector and strengthen the competitiveness of local producers. Such an approach allows for reduced compliance costs for SMEs, while ensuring increased trust in the value chain and improved access to external markets. In this regard, the development of public-private clusters in priority value chains would facilitate the testing of simplified compliance pathways and the experimentation with innovative monitoring tools. In parallel, the establishment of joint training and certification programs, partially financed by public funds but implemented by private providers and universities, can contribute to the continuous professionalization of producers and the creation of an organizational culture oriented towards quality and safety. Together, these mechanisms can support the modernization of the sector, strengthening the resilience and long-term competitiveness of Moldovan producers. The study demonstrates that food safety regulations play a dual role in shaping the competitiveness of local producers in the Republic of Moldova. On one hand, the alignment with EU directives and Codex Alimentarius standards imposes significant financial and technological challenges, particularly for small and medium-sized enterprises that dominate the ag-

ricultural sector. On the other hand, compliance with these regulations enhances product quality, consumer confidence, and access to both domestic and international markets.

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## Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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