

PERSPECTIVES FOR DEVELOPMENT AGRICULTURAL VALUE CHAINS: A PATH TOWARDS SUSTAINABILITY

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Abstract:

The agricultural sector is a cornerstone of Moldova's economy, accounting for over 13% of GDP and employing more than 30% of the workforce, especially within rural communities. However, the sector faces numerous challenges, including climate change, limited infrastructure, and market access barriers, which particularly affect smallholder farmers. This article examines the potential for developing Moldova's agricultural value chains by analyzing various sub-sectors through economic, environmental, and social criteria. Key findings highlight promising opportunities in horticulture, medicinal and aromatic plants, and animal husbandry. These value chains show strong potential for sustainable growth through strategic interventions, such as enhanced processing infrastructure, cooperative farming, and expanded market access. The study recommends targeted support in finance, capacity building, and policy reforms to foster a competitive, resilient agricultural sector in Moldova that can meet both local and international market demands. The article was developed within the framework of Subprogram 030101 „Strengthening the resilience, competitiveness, and sustainability of the economy of the Republic of Moldova in the context of the accession process to the European Union”, institutional funding.

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JEL classification: *Q 10, Q13, R10.*

Introduction

The agricultural sector is crucial to Moldova's economy, providing income and food security, particularly for rural communities. Agriculture employs over 30% of the workforce and contributes nearly 13% to the country's GDP. However, the sector faces significant challenges, such as climate change, limited infrastructure, lack of trust among various ecosystem stakeholders and barriers to accessing international markets. Smallholder farmers, who constitute a large part of the agricultural workforce, often find themselves at a disadvantage due to a lack of resources and the economies of scale enjoyed by larger enterprises.

This paper presents a detailed analysis of Moldova's agricultural value chains, identifying the most promising sub-sectors for sustainable development. The analysis evaluates various agricultural sub-sectors indicators based on their feasibility and impact. The objective is to propose strategic interventions that can enhance the competitiveness of Moldova's agricultural sector and promote long-term growth. Moreover, the report highlights the most promising and with perspectives value chains and sub-sectors that will be booming with right strategies and interventions.

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Methodology and Data

The pre-selection of value chains followed a rigorous methodology involving a comprehensive evaluation matrix that incorporated economic, environmental, and social criteria. The analysis used both primary data (gathered from interviews and consultations) and secondary data (from national statistics and market studies).

Eighteen agricultural sub-sectors were assessed using the evaluation matrix, which ranked them based on market demand, scalability, environmental resilience, and social equity. The sectors that scored highest were prioritized for development. The analysis also took into account existing support mechanisms, such as government programs and international donor initiatives, to highlight areas where further intervention could enhance the efficiency of these value chains. One important finding is that those value chains and sub-sectors which benefited of donors and state support continuously achieved remarkable targets and metrics, achieving highly valued competitive advantage.

Results

Key Findings: Value Chains Verticals

1. Horticultural Value Chains

Moldova's horticultural sector plays a significant role in the agricultural economy, particularly in fruit production. **Apple production** leads the sector, with a total area of 468 hectares under cultivation. In 2023, small and medium-sized farms accounted for 69.3% of the total production of apples, which reached 5,176 thousand tons. Apple exports represent a large portion of Moldova's agricultural trade, particularly to European Union markets, where demand for high-quality apples remains strong.

Plums are another major crop, with 61.6% of production coming from smallholder farms. Moldova's total plum output in 2023 was 1,503 thousand tons, with a significant portion destined for export. The plum value chain has potential for further development, particularly through value-added processing (e.g., dried plums, jams, and juices), which could increase profitability.

Cherries and **apricots** are also important crops, though they require further investment in infrastructure and technology to maximize their potential. In 2023, cherry production totaled 160 thousand tons, with smallholders contributing 57% of this output. Investments in cold storage and processing facilities would enable farmers to extend the shelf life of their produce and enter new markets with value-added products like preserved cherries and apricot jam.

Vegetable production is another high-potential area, especially for crops like tomatoes, cucumbers, and bell peppers. Vegetables are grown both in open fields and in protected environments, such as greenhouses. Greenhouse production, in particular, offers high profitability, with gross profit margins as high as 1166% when using two cropping cycles annually. In 2023, Moldova produced 229 thousand tons of vegetables, with tomatoes accounting for 28% of total production.

Investments in **post-harvest infrastructure**, such as cold storage facilities, would allow farmers to store their products for longer periods and sell them during off-peak times when

prices are higher. This would help mitigate the volatility of market prices during the harvest season and increase profitability.

2. Medicinal and Aromatic Plants

The cultivation of **medicinal and aromatic plants** presents a promising opportunity for diversification within Moldova's agricultural sector. Plants like lavender, mint, and rosemary are increasingly in demand for essential oils, herbal teas, and natural cosmetics. These crops are well-suited to Moldova's climate, and they can be grown using sustainable farming practices that promote biodiversity and reduce the need for chemical inputs.

In 2023, the cultivation of aromatic plants covered 53 hectares, with production concentrated in small and medium-sized farms (the data are provided by National Bureau of Statistics that are not clear enough). The **integration of apiculture (beekeeping)** with aromatic plant cultivation provides additional benefits. Bees that pollinate these plants produce higher-quality honey, which is in high demand both locally and internationally. Honey production is a low-cost, high-reward activity that can be easily integrated into existing farming operations, providing additional income streams for smallholder farmers. In 2023, beekeepers with 100 bee colonies earned an annual profit of 306,780 lei.

The **apiculture sector** also has strong potential for growth. Moldova's beekeepers produce high-quality honey, much of which is exported to European markets. In 2023, honey production reached 473.1 tons, and beekeepers earned an average profit of 306,780 lei per 100 bee colonies. The integration of apiculture with medicinal plant cultivation enhances both crop yields and honey quality, making it a highly sustainable and profitable value chain for smallholder farmers.

Berry production is another important component of the medicinal and aromatic plant value chain. In 2023, 85.1% of berry production in Moldova was concentrated in small and medium-sized farms, with **strawberries, raspberries, and blackcurrants** being the most commonly cultivated varieties. These berries are sold primarily in local markets, but there is significant potential for value-added products like jams, juices, and dried berries, especially for export.

3. Animal Husbandry

Small-scale animal husbandry, particularly sheep and goat farming, has significant untapped potential in Moldova. Sheep and goats are well-adapted to Moldova's rural landscape, where pastureland is abundant but underutilized. The production of **artisanal cheeses** and high-quality meat has strong demand in both local and export markets. In 2023, a typical sheep farm with 100 head of sheep generated an annual profit of 480,500 lei, with a return on investment of 87.5%. Goat farming offers similar potential, particularly for producing premium dairy products like goat cheese, which is increasingly popular in urban markets.

Economic Feasibility and Environmental Sustainability

The value chains selected for development are not only economically viable but also environmentally sustainable. The horticultural and vegetable sectors have strong export potential, particularly to the European Union, where Moldova's agricultural products are in high demand. **Apple production**, for example, accounted for 30% of Moldova's agricultural exports in 2023, with much of the fruit destined for Romania, Poland, and Germany.

Plum production is also highly export-oriented, with 80% of Moldova's plums being sold to international markets. There is growing demand for value-added plum products, such as dried plums and plum-based beverages, which could further enhance the profitability of the plum value chain.

The **vegetable sector** is similarly promising. In 2023, Moldova produced 65 tons of tomatoes per hectare, with a significant portion of this output exported to neighboring countries. Expanding greenhouse production would enable Moldova to produce vegetables year-round, reducing reliance on imports during the winter months and improving food security.

Environmental sustainability is a key consideration in the development of these value chains. **Medicinal and aromatic plant cultivation** is inherently sustainable, as these crops require minimal water and chemical inputs. Moreover, they can be grown organically, which increases their value in international markets where demand for organic products is rising.

Protected vegetable cultivation also contributes to environmental sustainability by conserving water and reducing the use of chemical fertilizers and pesticides. Greenhouses allow farmers to control the growing environment, resulting in higher yields and better-quality produce. This method of cultivation minimizes the environmental impact of farming and makes Moldova's agricultural sector more resilient to climate change.

Potential for supporting selected value chains as strategic initiatives

1. Fruit and Vegetable Processing

Description: The fruit and vegetable processing industry has high potential due to Moldova's diverse agricultural production. Developing processing infrastructure like canning, freezing, and drying will extend product shelf life and enable exports.

2. Dairy and Cheese Production

Description: Developing the dairy industry, particularly focused on producing high-quality cheeses, can boost both local consumption and exports. Moldova's pasture-based dairy farming supports the production of organic and artisanal dairy products.

3. Meat Processing (Sheep, Goat, and Beef)

Description: Investments in meat processing, particularly for sheep and goat products, can help diversify Moldova's agricultural economy. Exporting premium cuts and processed meats could enhance profitability.

4. Medicinal and Aromatic Plants

Description: Growing demand for medicinal herbs and aromatic plants like lavender and rosemary offers an opportunity to develop this niche. Processing plants for essential oils and teas can tap into global markets.

5. Honey and Beekeeping

Description: Honey production is well-suited for Moldova's rural regions. Improving processing, quality control, and marketing can increase export opportunities for high-quality organic honey.

6. Cereal Processing

Description: Moldova's cereal production can be expanded through value-added processing for both domestic consumption and export, including the production of flour, oils, and other food ingredients.

7. Wine and Grape Products

Description: Moldova's wine industry is already renowned, but expanding production and introducing new grape-derived products like juices and vinegars will open additional markets.

8. Nuts (Walnuts and Almonds)

Description: Walnuts are a major export for Moldova. Expanding production and adding value through processing (e.g., walnut oil, packaged products) will boost exports.

9. Poultry Production

Description: Developing the poultry sector, especially for organic or free-range chicken, offers potential in both local and regional markets. Modernizing production and processing facilities can increase competitiveness.

10. Sunflower Oil

Description: Sunflower seed production is traditional in Moldova. Developing the processing sector for sunflower oil can cater to the growing global demand for organic and cold-pressed oils.

Support Mechanisms and Development Interventions

To realize the potential of Moldova's agricultural sector, targeted interventions are needed in several key areas:

1. **Access to Finance:** Many smallholder farmers in Moldova lack access to affordable credit and grants, which limits their ability to invest in modern agricultural technologies such as irrigation systems and greenhouses. Providing farmers with access to low-interest loans or grant programs would enable them to invest in the infrastructure and technologies needed to increase productivity and profitability.
2. **Cooperative Farming:** Encouraging the formation of farmer cooperatives would help smallholders pool their resources, reduce production costs, and gain access to larger markets. Cooperatives also enhance farmers' bargaining power, allowing them to negotiate better prices with buyers and suppliers. Additionally, cooperatives facilitate knowledge sharing and the adoption of modern farming techniques, which is particularly important in value chains like horticulture and medicinal plant cultivation.
3. **Training and Capacity Building:** Farmers need training in modern agricultural techniques, including organic farming, water management, and pest control. Capacity-building programs should focus on sustainable farming practices that increase yields while minimizing environmental impacts. Financial literacy training is also important, helping farmers manage their finances and make informed investment decisions.
4. **Infrastructure Development:** Investment in post-harvest infrastructure, such as cold storage facilities and processing plants, is essential for improving the efficiency of Moldova's value chains. Without adequate infrastructure, farmers are forced to sell their produce at lower prices during the harvest season, reducing profitability. Government and international development agencies should prioritize infrastructure investments to support Moldova's agricultural growth.
5. **Market Access:** Expanding access to local and international markets is critical for the success of Moldova's agricultural sector. Moldova's proximity to the European Union provides significant export opportunities, but farmers must meet strict quality standards to compete in these markets. Support programs that help farmers obtain certifications and improve product.

Conclusions

In conclusion, the development of Moldova's agricultural value chains holds significant promise for fostering a more competitive and sustainable sector. Key areas such as horticulture, medicinal plants, and animal husbandry show strong potential for growth through targeted investments and strategic interventions. Enhancing infrastructure, promoting cooperative farming, and increasing access to finance can empower smallholder farmers and unlock economic opportunities. Sustainable practices and alignment with international standards will position Moldova to better access local and global markets. Prioritizing these initiatives will contribute to resilience and long-term prosperity in the country's agricultural landscape.

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