TRANSFORMATION OF THE FRUIT SECTOR IN THE REPUBLIC OF MOLDOVA: CHALLENGES AND OPPORTUNITIES IN THE FACE OF TECHNOLOGICAL MODERNIZATION

Scientific Researcher, Viorel TURETCHI
National Institute for Economic Research, ASEM, Republic of Moldova
E-mail: turetchi.viorel@ase.md

Abstract: *The fruit sector in the Republic of Moldova is undergoing a period of transformation, influenced by global market developments and the demands of external markets. With an annual apple production ranging between 400,000 and 600,000 tons, the Republic of Moldova is in a continuous process of modernizing cultivation technologies, particularly through the adoption of intensive and super-intensive technologies. These changes are essential to meet international market requirements and enhance the sector's competitiveness. At the same time, the sector faces challenges related to ensuring the quality of planting material, as the production of grafted trees for these technologies is costly and complex. Although local producers have begun adopting new varieties and technologies, many nurseries are not sufficiently equipped to meet market demands, leading to dependence on imports. In this context, the authorities in the Republic of Moldova support farmers in adopting modern technologies and improving the production of planting material, while collaboration between scientific institutions and producers is essential to enhance quality and efficiency in this field. The modernization of the fruit sector represents an opportunity for diversifying marketing channels and expanding exports.*

Keywords: *fruit growing, technologies, productivity, planting material, export.*
JEL Classification: *Q10, Q16, Q17, Q18, Q20, Q57.*

1. Introduction

The evolution of the global apple market has a direct impact on the fruit-growing sector in the Republic of Moldova. In a dynamic and ever-changing global economic context, the diversification of external markets requires not only adaptation to consumer preferences but also compliance with international standards regarding the quality and quantity of production. Thus, the domestic fruit-growing sector is undergoing a profound transformation, and the adoption of modern cultivation technologies is becoming crucial for maintaining competitiveness and economic efficiency. This entails achieving high yields of superior-quality apples by establishing orchards with productive, attractive, and internationally competitive varieties, as well as utilizing the most advanced technologies for their establishment and maintenance (Cimpoies, 2012, p.7).

In this context, the relevant authorities in the Republic of Moldova support farmers in adopting new agricultural technologies to improve yields and meet the demands of international markets. The transition from traditional apple cultivation techniques to more innovative methods has become a national priority.

2. State of knowledge on the issue

The state of knowledge regarding the horticultural sector in the Republic of Moldova is well developed; however, significant challenges persist, particularly in terms of modernization and the implementation of intensive technologies. Despite considerable progress in increasing production and diversifying export markets, the sector continues to face difficulties in ensuring high-quality planting material, especially for super-intensive technologies.

Research in this field has documented the evolution of the sector, clearly identifying modernization trends such as the transition to super-intensive orchards and the implementation of advanced technologies, which enable higher productivity and more efficient land use. At the same time, a reliance on imported planting material has been observed, highlighting the need for structural reforms in the production of grafted trees.

Furthermore, studies have examined the impact of geopolitical and economic changes, such as the conflict in Ukraine, on Moldova's export markets, emphasizing the necessity of market diversification. Regarding regulations, authorities have introduced measures to ensure the quality of planting material, with the National Food Safety Agency (ANSA) overseeing the production process.

3. Materials and methods

Several research methods were employed in the preparation of this report. A documentary analysis was conducted by examining official sources, legislative documents, and reports related to the horticultural sector in the Republic of Moldova, as well as statistical data on apple production and exports of planting material. Additionally, statistical data were used to analyze the evolution of the horticultural sector and the impact of market changes.

Another key method was market analysis, which involved studying external market trends and requirements, as well as the diversification of sales markets in the context of geopolitical and economic shifts. This approach aimed to understand the evolution and adaptation of apple exports from the Republic of Moldova. Observing the sectoral phenomenon was essential in evaluating the implementation of intensive and super-intensive technologies, as well as the challenges faced in the production of planting material.

Furthermore, a comparative study was conducted on the evolution of the horticultural sector from the Soviet period to its transition to a market economy, in order to identify specific changes and challenges. These methods provided a comprehensive understanding of the current context of the horticultural sector in the Republic of Moldova and the factors influencing its development.

This article was developed within the framework of Subprogram 030101: Strengthening the resilience, competitiveness, and sustainability of the Moldovan economy in the context of the European Union accession process, through institutional funding.

4. Results and discussion

The continuous evolution of the global apple market is driving significant transformations in the apple production sector of the Republic of Moldova. The diversification of external markets has led to increased variability in consumer preferences and has imposed higher standards regarding the quality and quantity of marketed production. To meet these demands, the adoption of modern cultivation technologies has become a necessity, requiring a fundamental shift in the current production model.

In this context, central authorities encourage local producers to accelerate the transition from traditional apple cultivation methods to innovative technologies that ensure both competitiveness in foreign markets and compliance with current quality and economic efficiency requirements.

The Republic of Moldova is among the leading apple producers in the region, with an estimated annual production ranging between 400,000 and 600,000 tons. This quantity comes from apple orchards covering a total area of 56,000 hectares, of which 21,767 hectares are

managed by agricultural enterprises specializing in fruit growing. These agricultural units, through the adoption and implementation of modern cultivation technologies, ensure an annual production of approximately 250,000 tons of high-quality apples, primarily intended for export to international markets. The main apple varieties cultivated in Moldova include *Golden Delicious, Idared, Gala, Fuji*, and *Granny Smith* (MoldovaFruct, 2025). However, there is a constant trend of varietal renewal, adapted to the dynamic market demands, to meet both consumer preferences and the international quality standards.

Until 2022, the Republic of Moldova annually exported between 200,000 and 250,000 tons of apples, with an average value of 89 million USD. The majority of shipments were directed towards the countries of the Commonwealth of Independent States (CIS). In 2022 alone, apples worth 65.3 million USD were exported to the Russian Federation (World Bank, 2025). However, the conflict in Ukraine has led to a reconfiguration of export markets, redirecting shipments toward the European Union and the Middle East. This shift has resulted in a significant reduction in the exported volume, which currently ranges between 120,000 and 140,000 tons annually. In 2023, the Republic of Moldova exported apples to 49 countries, diversifying its sales markets while maintaining a significant dependency on the post-Soviet space. The Russian Federation remained the primary destination, accounting for 52.9% of total exports. Kazakhstan was the second-largest importer, with a share of 17.4%, followed by Romania, which purchased 10.1% of Moldovan apples.

Other significant sales markets included Belarus (5.3%), the United Arab Emirates (3.8%), and Saudi Arabia (3.3%), reflecting a gradual expansion of exports to the Middle East. Additionally, smaller quantities of apples were exported to Uzbekistan (1.9%), Kyrgyzstan (1.3%), Oman (0.5%), and Qatar (0.5%). The remaining 3% of exports were distributed among 39 other countries, demonstrating the continuous effort of Moldovan producers to access new international markets and reduce dependency on traditional partners (Procopciuc, 2024).

Currently, the domestic apple production sector is entering a new stage of development, focused on increasing productivity, improving quality, and diversifying the varieties offered to consumers. In this context, the Republic of Moldova has begun implementing super-intensive technology, characterized by a density of up to 6,000 trees per hectare, advanced irrigation systems, and protection against adverse climatic phenomena, as well as intensive use of organic and chemical fertilizers. This method allows harvesting to begin as early as the third year after planting, reaching a maximum yield of 60-70 tons per hectare during the optimal fruit-bearing period. While this technology is relatively new for the Republic of Moldova, it is already widely implemented in countries such as Italy, Poland, the USA, Belgium, and the Netherlands. Regarding productivity, the highest average yields per hectare are recorded in Libya (56.9 t/ha), New Zealand (52 t/ha), and Chile (48.7 t/ha). The United States, the second-largest apple producer in the world, achieves a total harvest of 3.6 million tons, with an average yield of 35.6 t/ha. Notably, the total area of apple orchards in the U.S. is only 130.5 thousand hectares, reflecting the exceptional efficiency of this crop both in terms of quantity and quality (AtlasBig, 2025).

For the Republic of Moldova, this evolution, both in terms of quantity and quality, is attributed to the modernization process of the technologies in the domestic fruit-growing sector. Through the increasingly active implementation of intensive technologies, a steady increase in productivity has been achieved, accompanied by a reduction in the land area dedicated to this crop. In this context, agricultural systems with a high tree density, ranging

from 400 to 1,250 trees per hectare, have been developed. This approach has significantly reduced the total area of apple orchards while simultaneously increasing production.

Currently, the Republic of Moldova is in the phase of implementing super-intensive technology, which involves a density of up to 6,000 trees per hectare, along with the use of advanced irrigation systems and protection against extreme weather phenomena. This method allows for harvesting starting from the third year after planting, with a maximum yield of 60-70 tons per hectare during the optimal fruit-bearing period. The implementation of these advanced technologies brings the Republic of Moldova closer to international standards, representing a strategic direction for increasing competitiveness in the global market.

However, the transition of the domestic fruit-growing sector to intensive technologies faces various challenges. One of the major obstacles is ensuring quality planting material. Producing grafted trees on dwarf rootstocks, such as M9, which are essential for intensive and super-intensive technologies, is a costly and technologically complex process. Although the Republic of Moldova produces this type of planting material, many local nurseries are not sufficiently equipped to meet market demands, and many farmers prefer to import trees from countries such as Italy, Poland, or the Netherlands.

Looking back, during the Soviet era, the Republic of Moldova was known as the "garden of the Soviet Union," with extensive orchards supporting a steady demand for planting material. In this context, the State Enterprise "Codru," the main producer of grafted trees, achieved a production of 6.9 million seedlings in 1976, and by 1980, this figure had exceeded 10.3 million units. During this period, there were also mother plantations for rootstock material: 238 hectares dedicated to the production of grafting branches and over 120 hectares for rootstocks such as MM106, M26, and M27 (Rusu and Bratco, 2017).

Simultaneously, research efforts were initiated to develop rootstocks and varieties adapted to super-intensive orchards. However, the transition from a planned economy to a market economy led to major difficulties in the agricultural sector, significantly affecting the development of fruit-growing. The demand for planting material decreased significantly, and many nurseries could no longer market their production. As a result, in 2003, national production of grafted trees sharply declined, barely reaching the threshold of 300,000 units.

This situation prompted authorities to intervene through various support programs, leading to a revitalization of the sector. Initially, the production of fruit tree planting material in the Republic of Moldova was regulated by Law no. 728-XIII of February 6, 1996, regarding fruit growing, which establishes the requirements for the production, testing, control, certification, and commercialization of this material (Legis.md, 2024). To ensure the quality and health of planting material, the responsibility for its certification lies with the National Food Safety Agency (ANSA), which monitors the entire production process, ensuring compliance with international standards. As a result, in 2016, the production of grafted trees reached approximately 7.7 million units (iroul Național de Statistică, 2025).

However, current requirements impose new standards for the production of planting material, dictated both by the necessity of cultivating specific apple varieties and by the preference of orchardists for super-intensive orchards. A significant portion of local producers cannot meet these requirements, prompting farmers to import grafted trees from Italy, Poland, and other countries, at a cost of approximately 5 to 10 euros per unit. This dependence on imports highlights the need for a structural reform of the tree planting material production sector. Modernizing this sector would not only meet the domestic market's needs but would also facilitate the exploitation of growing demand in the international market. Although, in

2022, Moldova received permission to export apple (Malus domestica) and walnut (Juglans regia) planting material to the European Union, there are still significant opportunities for expanding and strengthening exports.

One of the key features of the superior biological value tree planting material production system is the direct involvement of institutions and scientific researchers in the production process, especially in the stages of breeding and biotechnology. Thus, the integration of science with the production process becomes evident and necessary, with the optimal form of organization being the scientific and production association (Babuc, p.51). In a market economy, the activity of the association is based on partnership principles, established through mutually beneficial contracts between partners, with the board of directors and owners serving as the supreme coordinators of the activity.

4. Conclusions

In conclusion, the fruit sector in the Republic of Moldova is undergoing a crucial period of transformation. Superintensive technologies represent the future of fruit growing in the country, offering a unique opportunity to increase productivity and meet the demands of the international market. However, for this sector to become competitive in the long term, the modernization of the nursery production sector is essential. Only through investments in modern nurseries and the adoption of best agrotechnical practices can the Republic of Moldova become a significant global player in the apple industry.

References

1. AtlasBig, 2025. *Site.* [online] Available at: <https://www.atlasbig.com/ru> [Accessed 15.02.2025].
2. Babuc, V., 2013. *Producerea materialului săditor de măr*. Chisinau: Bonss Office Publishing House, Universitatea Agrară de Stat din Moldova.
3. Biroul Național de Statistică, 2025. *Home.* [online] Available at: <https://statistica.gov.md/ro/comertul-international-cu-marfuri-al-republicii-moldova-in-luna-9539_61397.html> [Accessed 15.02.2025].
4. Cimpoies, G., 2012. *Cultura mărului*. Chisinau: Bonss Office Publishing House, Universitatea Agrară de Stat din Moldova.
5. Legis.md, 2024. *Legea nr. 728-XIII din 6 februarie 1996* [online] Available at: <https://www.legis.md/cautare/getResults?doc_id=118834&lang=ro> [Accessed 25.02.2024].
6. MoldovaFruct, 2025. *Mere.* [online] Available at: <https://moldovafruct.md/product-category/fruit-suppliers/mere/> [Accessed 15.02.2025].
7. Procopciuc, M., 2024. Merele - cele mai importante fructe moldovenești, la capitolul exporturi au cedat în fața strugurilor de masa, opinie. *Institutul pentru Dezvoltare si Initiative Sociale Viitorul.* [online] Available at: <http://viitorul.org/ro/content/merele-cele-mai-importante-fructe-moldovene%C8%99ti-la-capitolul-exporturi-au-cedat-%C3%AEn-fa%C8%9Ba> [Accessed 17.02.2024].
8. Rusu, D. and Bratco, D., 2017. Producerea materialului saditor pomicol in spatial pruto-nistrean. *Pomicultura, viticultura si vinificatia*, 1(67), pp.1-8. [pdf] Available at: <https://ibn.idsi.md/sites/default/files/imag_file/28-35_2.pdf> [Accessed 17.02.2025].
9. World Bank, 2025. *WITS.* [online] Available at: <https://wits.worldbank.org/Default.aspx?lang=en> [Accessed 15.02.2025].