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CURRENT TRENDS IN THE DEVELOPMENT OF APPLE PRODUCTION IN THE REPUBLIC OF MOLDOVA

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Abstract

Apple production holds a significant share in the horticultural sector in terms of surface and value of production in the total output. The development of this sector has attracted the attention of many specialists and investors, which has contributed to the increase of production between 2005 and 2019 more than twice. The foreign trade in apples of the country is based on a positive trade balance, but there are also some specific risks that are to be investigated in this study. The paper aims to perform an analysis of the situation related to apple production in the Republic of Moldova, as well as the presentation of development trends in the sector. The analytical, descriptive and comparative research methods allowed formulation of conclusions on the current situation in the sector. Despite the decrease of planted area, there is a significant increase in apple production, starting with 2014, as a result of changing planting practices, choice of newer and more productive varieties required on markets. Planting of super intensive orchards in the Republic of Moldova has determined a high productivity in the last 4 years.

Key words**:** *apples, production, Republic of Moldova*

INTRODUCTION

The agriculture sector has a major impact on the Moldavian economy [11], Moldova being one of the countries with significant potential in agriculture, one of the largest areas and farmland as a share of total land [13]. Currently, the agricultural sector is undergoing a significant period of modernization and development, relying on the gradual transition to a competitive agriculture, which implies the existence of advantages, both on the internal and external markets [7]. Agricultural production has a relatively stable growth trend, except for years with severe climate conditions like droughts from 2007, 2012, 2020. Crop production still dominates the structure of the agricultural output, with a share of over 70% in the last 3 years.

Moldova's mild favourable climate and high quality soils determined Moldova's agricultural specialization, particularly in the production of high value crops like fruits and vegetables [12]. Growing multiannual plantations represents a historic activity for inhabitants of the country. In the past, Moldova was one of the largest producers and processors of fruits in the former Soviet Union with most of the production exported to other Soviet republics. For this reason, Moldova was described as the "orchard" of the Soviet Union [6].

Development of fruit growing sector in Moldova at present lies in the efficient operation of orchards' existing potential and their replacement successively with new orchards super intensive type with an assortment of modern and advanced technologies that bring into early bearing, high productivity of fruits during fructification, required quality and competitive in domestic and foreign markets [1].

Previous studies in the field were carried out by [2 and 3] who pay a special attention to super intensive orchards and their benefits for increasing the productivity of the sector. A study on agriculture sector in Moldova developed by JICA carries out a brief examination of apples value chain, pointing on the cost-benefit analysis of apple orchards [5].

A more in depth study on the Moldovan apples value chain was carried out by [6] who analysed production, surfaces, trade, as well

as distribution channels. In the absence of more recent studies in the field and taking into account that apple production holds a notable share in the total agricultural output of the Republic of Moldova, ranging between 2.3% in 2014 to 6.08% in 2017, the paper aims to perform an analysis of the situation related to apple production in the Republic of Moldova, as well as the presentation of the current development trends in the sector.

MATERIALS AND METHODS

Analysis carried out within this paper is based mainly on the data and documents provided by the National Bureau of Statistics of the Republic of Moldova [10] when analysing the surfaces, production and consumption aspects. Trade data has been accessed from UnComtrade [14] and WITS databases [15]. Data on valorization of export quotas to EU were accessed from the official web site of the Ministry of Economy and Infrastructure of the Republic of Moldova [8]. The used data covers the period 2007 – 2019.

The methodological approach is based on the methods particular for the economic research, such as data identification, selection and analysis, comparison, synthesis and formulation of conclusions. The research work is based on a broad quantitative analysis, comprising a descriptive part of the sub-sector and an analysis of the current trends.

RESULTS AND DISCUSSIONS

Apple plantations over the years have occupied a major share in the total of multiannual plantations of fruit, berries and nuts in the Republic of Moldova. If in 2007 they held a share of 58.9%, then in 2019 their segment decreased to 39.9%. This result is due to two major factors: the decrease of apple areas by 13.6% in the analysed period, as well as the considerable increase of the total area of multiannual plantations of fruits, berries and nuts by 27.7% (Figure 1).

Most of the apple plantations belong to the individual sector, their surface having relatively constant values in an average of 38 thousand ha in the last 5 years.

At the same time, there is noted a considerable decrease in the area of apples in agricultural enterprises, from 30 thousand ha in 2007 to 19 thousand ha in 2019.

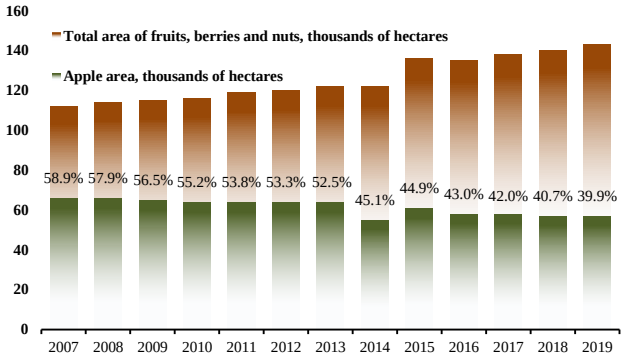

Fig. 1. Total area of fruits, berries and nuts, and area of apples, 2007 -2019, thousand hectares
Source: author's calculations based on [10].

In territorial profile, within the agricultural enterprises and peasant farms that have an area of 10 hectares and over and deal with apple growing, there is strongly observed a regionalization of the location of apple plantations, especially in the Northern region where they occupy an area of approximately 60% of the total fruit, berry and walnut plantations in 2007 and 70% in 2019 (Fig. 2).

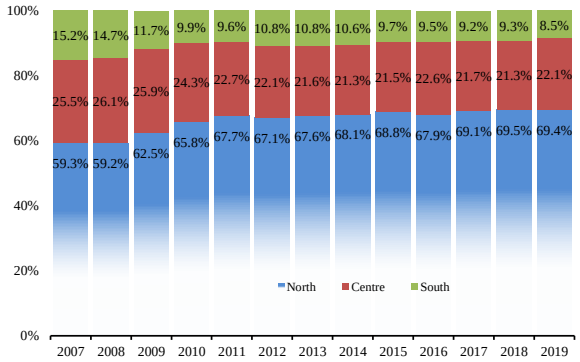

Fig. 2. The total area structured by geographical areas of agricultural enterprises and peasant farms with an area of 10 hectares and more, %.
Source: author's calculations based on [10].

However, this figure is not due to the actual increase of areas in the Northern part of the country, but on the contrary, to the decrease of areas in the Central and Southern part of the country where in the period 2007-2019 apple plantations decreased by 30.8% and 45.0%, respectively.

During the period 2007 – 2019, overall, the apple production in all categories of farms increased by 2.8 times. The individual sector experienced a considerable increase by 3.8 times (Figure 3).

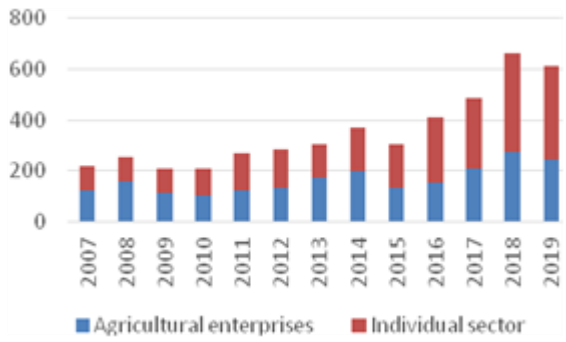

Fig. 3. Total apple production in all categories of farms, thousand tons
Source: author's calculations based on [10].

In agricultural enterprises and peasant farms with an area of 10 hectares and more, although the surface of the given crop decreased between 2007 and 2019, it did not lead to the diminish in production.

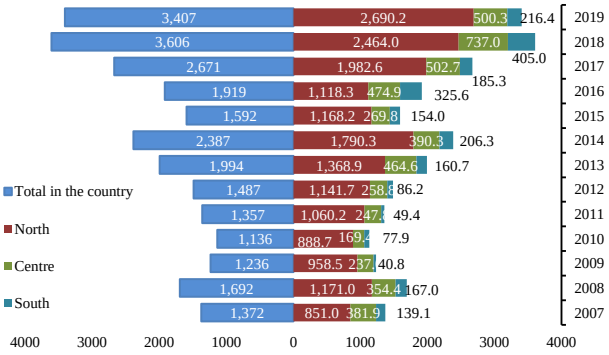

Fig. 4. Apple production structured by geographical areas of agricultural enterprises and peasant farms with an area of 10 hectares and more, thousand quintals
Source: author's calculations based on [10].

On contrary, there is noted a significant increase as farmers start to focus more on the selection of grown varieties, plant protection products and many other aspects that significantly improved the average yield per hectare from 45.2 quintals/ha in 2007 to 158.3 quintals/ha in 2019, which eventually led to an increase in total production in the given period of about 2.5 times (Figure 4).

The main reason of the increase in production and yield, despite the decline in planted area is due to the change in the farming practices, mainly planting of new varieties of apples. According to [2], super intensive orchard apple tree planting material for 2 years with chronic trees allows to get the first crop of 1-2 year after planting with capital spending recovery in 2 years, being characterized by the following advantages: increased productivity of quality fruit per unit of plantation area by 4-6 times; decrease of the prime cost of production essential – by 2-3 times; more efficient use of agricultural machinery, water, mineral fertilizers, etc.

As for apple varieties, according to data from Catalogues of plant varieties for 2014 till 2021, in 2021 there were registered 13 summer varieties of apples (9 in 2014), 16 of autumn varieties (no changes compared to 2014) and 48 of winter varieties (compared to 34 in 2014) (Catalogue of plant varieties, 2021) [4]. The last registration of apple varieties took place in 2016, when 2 new varieties of winter apples have been included in the catalogue. This may represent an important barrier for Moldovan producers of apples as year by year international markets require new varieties which are not registered and approved yet in our country.

The trade balance of foreign trade with apples in the Republic of Moldova has always been positive and during the period 2007-2019 has only increased. Within the commodity group 08 “Edible fruits and nuts”, apples have had a continuous stability, reaching a share of about 24 -25% over the period.

Although there are small quantities of imported apples, the domestic product fully satisfies the local market and preferences of consumers. If in 2015 the self-sufficiency level accounted for 209.8%, then in 2019 it reached the value of 270.5% (Table 1).

Around 80% of apples are sold as fresh product, while the surplus apples and apples of poor qualities are used by the processing industry, mainly to produce apple juice concentrate.

Apples play a predominant role in production, storage, and sales as apple producers and traders have and use the bulk of post-harvest infrastructure.

Table 1. Balance of food resources and uses for apples, 2015 - 2019

Elements of the balance	***Apples, thousand tons***				
	2015	2016	2017	2018	2019
Resources					
Production	308	412	487	665	611
Import	2	3	4	10	4
Stocks variation	6	-10	-5	-164	-66
Total resources	**316**	**405**	**486**	**511**	**549**
Uses					
Export	169	194	296	281	324
Seeds	-	-	-	-	-
Forage	1	1	1	1	1
Processing for non-food purposes	32	39	43	58	55
Losses	5	4	2	6	8
Personal consumption of the population	109	167	144	165	164
Total uses	**316**	**405**	**486**	**511**	**549**
Self-sufficiency level, %	209.8	195.9	256.0	289.9	270.5

Source: author's calculations based on [10].

Nevertheless, sorting and packing lines as well as packaging materials are often missing, which leads to low quality exports [5].
Out of the total apple resources during the years 2015-2019, approximately 50 - 60% were intended for export.

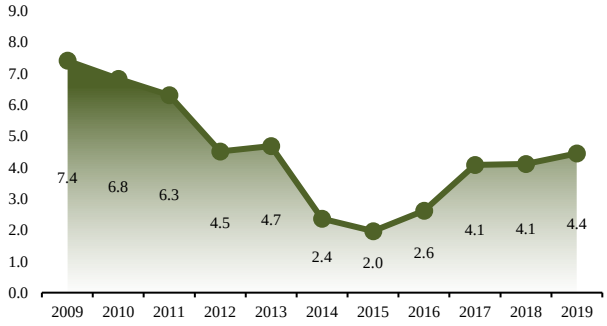

Fig. 5. Share of fresh apples in the total export of agri-food products, 2009 - 2019, %
Source: author's calculations based on [14].

This product has a fairly significant share in the total value of agri-food exports. Even of in 2009 this product had a share of 7.4% and in 2019 - 4.4% of total exports of agri-food products, this does not necessarily mean a decrease in exports. The export of fresh apples increased from 44.7 million. USD in 2009 to 53.7 million. USD in 2019 (Figure 5).
When analysing the export potential of apples through the Revealed Comparative Advantage (RCA) indicator, one can note that the Republic of Moldova holds a significant value of this index. This indicator measures the export of a product with the country's total exports and the export performance of a set of countries. If RCA> 1, it denotes a comparative advantage, for example: the sector in which the country is relatively specialized in the terms of exports [9].
As a result, in the period 2009 - 2019, the RCA values for apples of Moldovan origin underwent a period of decrease, the minimum value being reached in 2015, and subsequently in the last 4 years, a continuous increase of the respective indicator was registered (Figure 6).

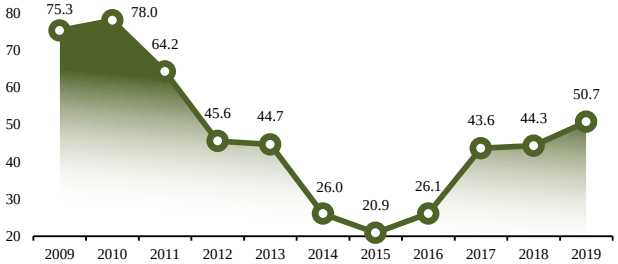

Fig. 6. RCA of fresh apples in relation to the world countries, 2009 - 2019.
Source: author's calculations based on [15].

Although the RCA value for fresh apples is quite high and at first sight demonstrates that apples are quite competitive on the world market, this statement can be questioned following the analysis of exports by countries.
In 2009, the Republic of Moldova had 9 export partners for fresh apples and over the years this number increased significantly to 15 partners in 2019, while the maximum number accounted for 23 partners in 2018. However, throughout the analysed period, the main export partner has always been Russian Federation, who in 2009 imported about 89.2% of the total export of Moldovan fresh apples, while in 2019 this figure reached 97.8% of the total fresh apples exported. Of course, this type of export dependence also involves certain risks, like the ones that occurred in 2014 when agricultural producers suffered losses as a result of political context, the end of which was the imposition of an embargo by the Russian Federation on fresh apples and other Moldovan origin products (Figure 7).

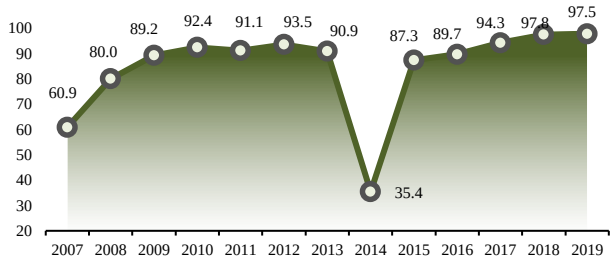

Fig. 7. Share of apples exported to Russian Federation from the total exported fresh apples, 2009 - 2019, %.
Source: author's calculations based on [14].

Certainly, in the nearest future, one solution to overcome the existing dependency problem is to diversify the export markets and minimize these risks. In this regard, a notable aid came from the European Union, which through the Deep and Comprehensive Free Trade Agreement ratified on July 2, 2014 by the Parliament of the Republic of Moldova allows domestic producers to export an assortment of products including apples on the European Union market at a preferential trade relationship. DCFTA set an export quota of 40 thousand tons for fresh apples of the Moldovan origin. Nevertheless, existence of DCFTA has not significantly changed the export directions of domestic apple producers, who during the years 2015 - 2020 valorized the set tariff quotas only in the limits of 5% [8]. However, during the period 2014 – 2020, there is noted a small upward trend in exports to the European Union market. The main EU country that imports Moldovan apples is Romania, with a share of 1.4% of the total exported Moldovan apples in 2019 (Table 2).

Table 2. Valorization of tariff quotas on apple exports to the EU

2015		**2016**		**2017**		**2018**		**2019**		**2020**	
tons	%	tons	%	tons	%	tons	%	tons	%	tons	%
746	1.8	74	0.19	2,191	5.5	1,859	5	2,300	6	1,577	4

Source: based on [8].

One of the main causes that hinders the export of Moldovan fresh apples to EU is related to the high standard of food safety requirements at the European level that still can not be completely reached by Moldovan producers, as well as apple quality overall, including the visual aspects, packaging, etc. At the same time, it is quite difficult to compete on the EU market with their local producer – Poland. EU has a high demand for Polish apples, they being by far the main Polish export fruit. Apples account for over 75 percent of export volume of all fruit shipped from the country to abroad and at the same time over 1 percent of the value of Polish agri-food exports [4].
Most of the improvements regarding the apple cosmetic appeal and the cost per kg can be achieved by the growers in their orchards by: planting intensive orchards using modern varieties with improved coloring; introduction of chemical thinning; improved use of orchard irrigation; improved plant nutrition, based on soil, water and plant-tissue analysis; installation of anti-hail nets and frost protection systems in the orchard; appropriate winter and summer pruning; improved pest management; implementation of appropriate harvesting tools; improved human resource management (training of workers, process planning) and labor productivity [6].

CONCLUSIONS

Apple production has always been treasured by farmers from the Republic of Moldova who are ready to grow a considerable share of multiannual plantations of this product. Farmers, especially from the Northern part of the country, have been working hard on increasing efficiency of plantations and substitution of old varieties with new ones in order to eventually increase the yield per hectare in average by 3 times. The RCA index, as well as assortment of export partners show that Moldovan apples are and further can be quite competitive on the world market. At the same time, a major disadvantage is that up to 97% of apples are purchased by the Russian Federation, which can use this moment as a lever of control in political issues as it was the embargo from 2014. The Deep and Comprehensive Free Trade Agreement offers some advantages for our producers on the EU market, but these opportunities have

not been achieved so far due to various reasons like: lack of capacities to offer high standard products in terms of food safety and quality, including the visual and organoleptic aspects, packaging, etc. Therefore, for the future development of the sector, the following recommendations are proposed:

-Introducing a new model of granting subsidies for all fruit plantations, including apples. The current model relies on post-investment subsidies offered for every action in particular (deforestation, establishment of plantation, installation of anti-hail, anti-rain and irrigation systems, etc.). The new model should focus on the investment object (apple orchard) as an integral object, subsidies being granted for the development of orchard from A to Z.

-Diversification of export partners (i.e. countries from the Middle East, Asia, etc.) that will reduce the strong current dependency on one market.

-Improving the quality of product according to international and EU standards.

-Development of logistic component, like packaging, visual aspects, development of logos and trademarks so that the Moldova apples can be easily noticed abroad.

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