# ANALYSIS OF DOMESTIC PRODUCTION IN RELATION TO THE DEMAND AND SUPPLY OF GRAPES IN ROMANIA

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*Abstract*

*The vine sector represents an important branch of agriculture in Romania, thus it is considered necessary a detailed analysis of it, for the passing 12 years, taking into account the characteristic technical-economic elements, as well as the components of demand and supply and foreign trade. The paper aims to determine both the trade deficit, by analyzing the trade balance, as well as by calculating the share held by the domestic production of grapes in the supply and demand on the internal market. Thus, will be determinate the degree to which the demand is covered by the domestic production,, but also the weight held by the domestic production offered.*

*Key words*: *consumption, demand, indicators, supply, trade balance*

## INTRODUCTION

Among the most developed sectors of the Romanian agriculture it is the vine and wine sector, which has benefited from a great financial support with the accession of Romania to the European Union. Both the PNDR program 2007-2013 and the PNDR 2014-2020 reported a majority absorption of the funds destined to the viticulture, the main investments being made in the new plantations and purchase of technologies and machines.

The Romanian vine and wine sector represents an important weight in the Romanian agriculture, the geographical location of the country and its relief ensuring all favourable conditions for this culture. [2] According to the law no. 244/2002 of the vine and the wine, the vineyards plantations are grouped territorially in wine regions, wine areas, wine centres, vineyards and vineyards.[5]

In Romania are 8 wine regions: Hills of Moldova, Hills of Muntenia, Hills of Oltenia, Hills of Banat, Hills of Crişana and Maramureş, Plateau of Transylvania, Terraces of Dobrogea.[6][8]

Regarding the areas occupied by the vineyards, Romania occupies the 11th and 5th place in the world in the EU, the industry developed in this sector having a significant contribution to the national GDP. [1]

The main raw materials resulting from these plantations are table grapes and wine grapes. According to the specialized studies the wine grapes represent a share of approximately 95% of the total grape production, the resulting product being analyzed both quantitatively and qualitatively to be within the European norms.

In the paper "Potential and risk in Romanian wine industry", by Bărbulescu O. (2017), are presented some historical, geographical and institutional landmarks of the national wine sector, highlighting that promoting this sector on foreign markets is essential, as well as the use of native varieties of vines. In order to capitalize on the tourism potential of the wine sector, Romania has a series of wine cellars that attract tourists during the harvest of grapes, as they are great lovers of tasting various assortments of wine, according to National Tourism Development Master Plan 2007-2026. Lădaru et al. (2014) [4] sustained a series of hypotheses regarding the competitiveness of the wine sector aimed at increasing the attractiveness of Romanian grape varieties and wines on the domestic and foreign market, thus stimulating consumption.

## MATERIALS AND METHODS

The statistical data taken in the analysis in the paper were provided by INSSE (National Institute of Statistics), Trade Map and MADR, but also information obtained from the specialized documents and reports.

With the help of research methods and the specialized literature, the commercial deficit and the importance of ensuring the necessary consumption will be highlighted.

The data taken in the study it is over a period of 12 years, presents a retrospective of the vine and wine sector, being necessary an analysis of the surfaces, the total and average productions per hectare, thus processing the series of chronological data with the help of different statistical indicators such as arithmetic mean, standard deviation, coefficient of variation and annual rate, these being determined using the following formulas:

*-arithmetic mean:* $\overline{X} = \frac{\sum_{i=1}^{n} x_i}{n}$, where $x_i$- observed values; n- number of observed values;

*-standard deviation*: $S = \sqrt{\frac{\sum_{i=1}^{n}(x_i - \overline{x})^2}{N-1}}$, where $x_i$- observed values; N- number of observed values, $\overline{x}$– the average of the observed values;

*-average annual rate*:
R= [radical by order n-1from $(x_n / x_0)$ ] - 1 * 100, where $x_n, x_0$ – current year value - previous year. [3],[8]

## RESULTS AND DISCUSSIONS

According to international statistical data, Europe has the largest area of vines, about 3.6 million hectares, followed by Asia with 1.9 million hectares and America with 975 thousand hectares. [7]

Romania has an average area of 179.53 thousand hectares of vineyards, the majority of which is held by the wine grape areas with 95.5% (171.63 thousand hectares), the areas with table grapes being only 4.5% (8.28 thousand hectares).

About 60% of the country's wine-growing area is owned by three regions: Moldova, Muntenia and Dobrogea, in these areas where favorable conditions for the development of viticulture are found [9].
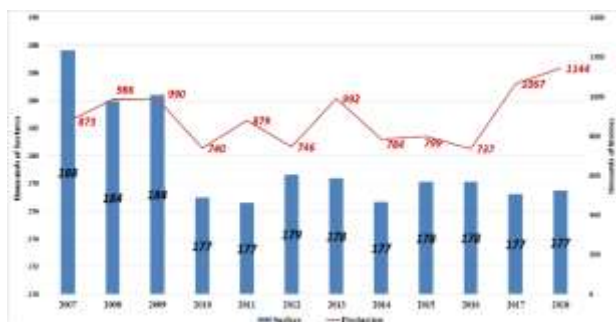


Fig. 1. The evolution of vine areas and grape production in Romania
Source: own processing based on INSSE

During the period 2007-2018, the area with vines registered a negative annual rate of -0.5%, with a decrease of 5.4% in total, from 188,629 hectares in 2007 to 177,497 hectares in 2018.

The surface of the vineyards on the fruit recorded, during the analyzed period, a deviation, compared to the average, of 3.66 thousand hectares, which resulted in a coefficient of variation of 2%. This coefficient being reduced, considering that vineyards are perennial.

Table 1. Statistical indicators on the evolution of areas (hectares)

| Specification | Average | Minimum | Maximum | Annual rhythm | Standard deviation | Coef.. Variation |
|---|---|---|---|---|---|---|
| Total- vines | 179,531.2 | 176,616 | 187,629 | -0.50 | 3,665.59 | 2% |
| Table grapes | 8,281.8 | 6,335 | 11,202 | -5.05 | 1,520.01 | 18% |
| Grapes of wine | 171,463.2 | 167,420 | 176,427 | -0.27 | 3,002.01 | 1.7% |

Source: data processed from the INSSE.

During the study period, it can be noted that the introduction of a restructuring / conversion measure of the vineyards (according to MADR) had a positive impact on the wine sector so that, with the introduction of this measure in 2010, about 5 were subjected to conversion, 1 thousand hectares, in 2013 about 7.4 thousand hectares, and in 2015 only 2,900 hectares. By accessing this measure, the Romanian producers have succeeded in reviving this sector. This could be possible by restructuring and modernizing important areas of vines that correspond to the current market requirements.

Analyzing the total production of grapes in the period 2007-2018, it is noted that at country level it fluctuated, registering a coefficient of variation of 15.51% per year, with an annual growth rate of 2.48%, this due to - it mainly produces wine grapes. The average grape production for the analyzed period is 894.8 thousand tons, registering a minimum production of 736.8 thousand tons in 2010 and a maximum one of 1.14 million tons in 2018.

Table 2. Statistical indicators on production evolution (tonnes)

| Specification | Average | Minimum | Maximum | Annual rhythm | Standard deviation | Coef.. Variation |
|---|---|---|---|---|---|---|
| Total- vines | 894,822 | 736,892 | 1,144,305 | 2.48 | 138,795.6 | 15.51% |
| Table grapes | 56,880.17 | 35,959 | 81,789 | -1.17 | 16,208.4 | 28.50% |
| Grapes of wine | 839,216.6 | 690,462 | 1,072,900 | 2.79 | 131,030.6 | 15.61% |

Source: data processed from the INSSE.

The average production per hectare of grapes followed an oscillating trend, registering values between 4,163 kg/ha and 6,447 kg/ha. All these fluctuations are due to both the restructuring of the surfaces, the climatic influence and the biological conditions (varieties, rootstocks), the technology adapted to each variety and plantation.

According to the data in Fig. 2, it can be observed that the average grape production has recorded inversely proportional values of the areas recorded, indicating that although the areas of grapevine have decreased, the average yields have remained or increased, this being due vine varieties with high yields. If in 2007, the average production was 4,654 kg/ha, in 2018, it increased by up to 27%. (6,447 kg / ha).
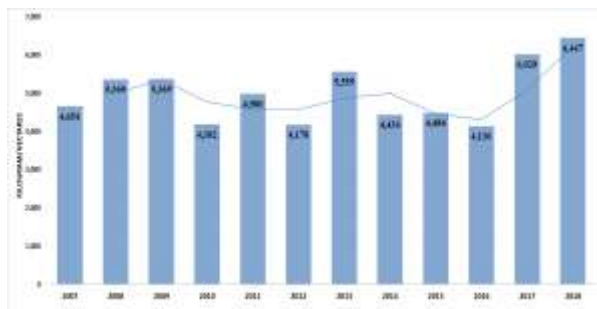


Fig. 2. Evolution of average grape production per hectare
Source: data processed from the INSSE.

The imports of grapes from the quantitative point of view, shown in Fig. 3, show a growth trend starting with 2011 in which 17.82 thousand tons were imported, reaching 44.99 thousand tons in 2018, the quantity of grapes imported being 2 times larger.

Among the top countries from which Romania imports grapes in 2018 are Moldova (12,045 tons), Spain (7,871 tons) and Italy (4,476 tons), compared to 2016, the imports is growing in 2017.

During the analyzed period it can be observed that the quantity exported of grapes is reduced. The smallest quantitative value registering in 2018, of only 0.43 tons, and the highest in 2012 with a volume of 1,822 tons.

However, as can be seen in the figure below, even though Romania exported the most in 2012, the trade balance is not the most favourable in that year, with a deficit of 27.8 tones, thus, the level trade balance is dictated by the volume of imports.
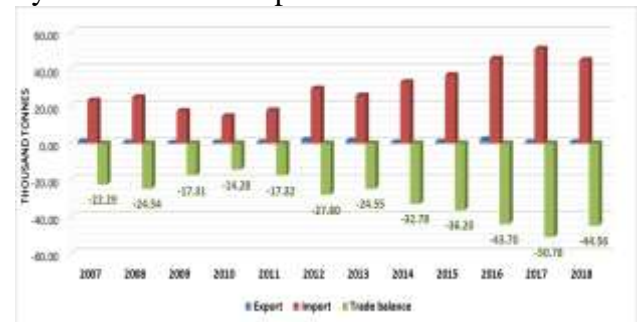


Fig.3. Quantitative commercial balance of grapes (tones)
Source: own processing based on trademap.org

From a value point of view, the imports of grapes show an upward trend, so that if in 2010 the value of the imports was of 11.13 million USD, in 2018, this value being 5 times higher (55.31 million USD).,



Fig.4. Value trade balance of grape (tones)
Source: own processing based on trademap.org

In Fig. 4 we can see the evolution of the commercial balance of grapes. It shows a tendency to increase the deficit, this situation can be generated by the high quantity of imported grapes and the low price that is practiced abroad. In 2018, the deficit value it is reached at 54.78 $ million.

In order to determine the average purchase and sale price of grapes from Romania, we analysed the volume and value of imports and exports, so over the 12 years there is recorded an average export price in the amount of 1.3 $ per kilogram, registering a decreasing trend. The average import price for the analyzed period is lower than the export price, being worth 0.92 $ per kilogram, but with an increasing trend.

Table 3. Demand and supply of grapes from Romania

| Specification | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Domestic grapes production** (table grapes, thousands tones) | 81.3 | 81.8 | 73.5 | 49.7 | 56.0 | 49.0 | 55.4 | 36.0 | 42.1 | 38.8 | 47.7 | 71.4 |
| **Import** (thousands tones) | 23.2 | 24.9 | 17.5 | 14.6 | 17.8 | 29.6 | 25.9 | 33.1 | 36.9 | 45.9 | 51.3 | 45.0 |
| **Export** (thousands tones) | 0.9 | 0.3 | 0.2 | 0.3 | 0.5 | 1.8 | 1.3 | 0.3 | 0.7 | 2.2 | 0.5 | 0.4 |
| **Supply of grapes** (thousands tones) | 103.6 | 106.3 | 90.8 | 63.9 | 73.3 | 76.8 | 79.9 | 68.7 | 78.3 | 82.5 | 98.5 | 116.0 |
| **Grape consumption** kg/inhabitant/year | 5.5 | 7.6 | 7.3 | 5.4 | 6.6 | 6.3 | 6.7 | 6.2 | 6.9 | 6.9 | 7.9 | 7.19 |
| **Share of internal grape production from supply** % | 78% | 77% | 81% | 78% | 76% | 64% | 69% | 52% | 54% | 47% | 48% | 62% |
| **Demand** (thousands tons) | 116.2 | 156.8 | 149.2 | 109.6 | 133.3 | 126.6 | 134.1 | 123.7 | 137.1 | 136.3 | 155.2 | 140.5 |
| **Share of internal grape production from demand** % | 70% | 52% | 49% | 45% | 42% | 39% | 41% | 29% | 31% | 28% | 31% | 51% |

Source: own processing based on www.insse.ro data, demap.org, MADR.

Factors that could influence the demand for grapes can be: standard of living, lifestyle, purchasing power and consumer preferences. The supply of grapes can be determined by technical indicators such as: cultivated areas, total and average yields, technologies used, climatic factors.

The supply of grapes is determined in a significant proportion by the internal production of grapes, to which the volume of imports is added and the volume of exports is decreased. In conjunction, an average growth rate of supply of 1.02 % is recorded. Thus, it can be appreciated that the volume of imports is the one necessary to ensure the stability of the supply. Analyzing the share of domestic grape production from the supply, it can be observed that, in the period 2007-2013, the value was over 65%, this percentage

indicating the volume of indigenous grapes on the domestic market. In the period 2014-2017 this weight ranged from 47 - 54%, considering that the domestic production recorded the lowest values of the analyzed period.

During the analyzed period, the average annual consumption of grapes per inhabitant increased by 3.68% annually.

With the help of consumption, relative to the resident population, it was possible to determine the total demand on the market, this registering an increasing annual average rate, of 1.73 %, contrary to the fact that the population of Romania is declining. This increase comes from the increase of the average consumption of grapes per inhabitant, which can be explained by the reorientation of

the population towards a healthier lifestyle, and due to the properties of this product.

Similarly, analyzing the share of domestic grape production, by demand, it is positioned, on average, for the entire period analyzed, just over 40 percent, respectively 42%, with the exception of 2007 and 2018, when there was a share of domestic production in demand of 70% and 51%.

## CONCLUSIONS

Following the study it is found that both the areas of vines and total grape production fluctuated from year to year being influenced by various factors, from the restructuring of arable areas, the area of cultivation to the climatic factors and the yield of varieties. The supply on the grape market is insufficient and seasonal, this being supplemented by imports. Domestic production cannot cover the needs of consumers, given that it is limited, so that much of the demand for grapes on the market is purchased outside the country of Italy, Spain.

Although the population in Romania has a continuous tendency of decrease, during the analyzed period an increase of the total demand is registered. This being explained by the increase of the average consumption per capita, fact resulted by the reorientation of the population towards the healthy lifestyle, but also the increase of the standard of living that allows the purchase of agri-food products.

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