

ECONOMIC EFFICIENCY OF THE TABLE GRAPES SECTOR

Tatiana IAȚIȘIN

National Institute for Economic Research, 45, Ion Creanga Street, MD2064, Chisinau, Republic of Moldova, Email: tatianaiatisin@yahoo.com

Corresponding author: tatianaiatisin@yahoo.com

Abstract

The paper addresses the concept of economic development and efficiency which is most comprehensively expressed in an economic activity, evaluated in terms of resources consumed to carry out these activities. Viticulture has a well-defined place in the agricultural economy and national economy, the importance of which can be appreciated from several points of view. Currently, in the Republic of Moldova are planted approximately 126 thousand ha of vineyards, of which 18.9 thousand ha are planted with table varieties. Viticulture is an intensive sector in agriculture characterized by a high coefficient of land use. It has been calculated that the economic efficiency of viticulture is 10 times higher than that of field crops. The value of production obtained from one hectare, cultivated with vines is equivalent to 7 ha of cereal crops. The research was conducted based on data provided by the National Bureau of Statistics through methods of analysis, synthesis, tabulation and graphics.

Key words: economic efficiency, viticulture, vineyards, table grapes

INTRODUCTION

In agriculture, including viticulture, economic efficiency expresses the degree of use of the main factors, which are: intensification of production, improved use of investment, production funds, land, labor resources, perfecting of the planning, of the stimulation of methods, new forms of work organization. [5, 10, 17, 22, 23].

Due to the fact that in agriculture the land is the main means of production, which fulfills a dual function, means of labor and object of labor, it is one of the main terms for reporting indicators of economic efficiency. From this point of view, the economic efficiency of the production activity in agriculture presents an economic category that expresses the characteristic of producing maximum economic effects, with optimal living and materialized labor costs [9, 20].

The essence of the efficiency of agricultural production consists in the formation of a complex of requirements and conditions necessary for the enlarged reproduction, in the conditions of the competitive economy, which will allow the branch not only to satisfy the food needs of society but also to develop in harmony and to ensure the sustainable development of agriculture [21].

Following the analysis, we can conclude that economic efficiency is a complex economic category that most comprehensively expresses the results obtained in an economic activity, evaluated in terms of resources consumed to carry out an activity. Efficiency is that element, which allows the economic unit to obtain as much material goods and services as possible from land, labor, technical and material resources [23].

Table grape viticulture is a branch of the agro-industrial complex, which has a high adaptability to environmental conditions, relatively simple care and increased economic efficiency, etc. This is due to the centuries-old experience of winegrowers in several countries, such as Italy, France, Spain, Germany, and especially the rapid development of viticulture in recent times in the USA, China, South Africa, Latin America, Australia, etc.

Because table grapes, having curative-therapeutic qualities, through their ability to remove heavy metals from the human body, they are welcome to exist in human nutrition all year round. Producers have seen the need to extend the period of consumption of fresh grapes, which can be ensured in two ways: by cultivating varieties with a mid late or late maturation period, and by adjusting

agrotechnical processes and cultivation and storage technologies of the table grapes.

Table grape varieties are distinguished by different characteristics (aroma, color, shape / size of the grain and the maturation period), which allows the organization of plantations in the conveyor [6].

Because the maturation of table grape varieties is done in stages, in this way consumers have access to fresh production for a longer period of about 3-4 months. At the same time, the delivery of table grape production can be done over a longer period of time and involves a more balanced staggering of revenues. Depending on the market demand for table grapes, the cultivation of grapes differs and is profitable, and largely depends on several factors, such as: maturation period; grape quality; the cost of the products.

Market demand and increased efficacy in the cultivation of table grape varieties are given much less attention compared to the cultivation of wine varieties. This state is observed in many countries of the world, including the Republic of Moldova. This phenomenon is explained through the economic interest of which potential producers are still unaware, as well as the difficulties dictated by the specifics of the technology of cultivation of table varieties - more manual work care, harvesting, sorting, transporting, storage and commercialization of grapes [16].

The development of the cultivation of table grape varieties at the level of current and future requirements cannot be conceived without knowing their agrobiological and productive potential and how they react to different climatic factors and agrotechnical procedures (driving system, cutting length, grapevine trunk load, green operations, etc.). Therefore, the study of existing and new local varieties is a current issue [6, 9].

The productivity of the vineyards and the sustainability of their exploitation depend on the biological value of the planting material, on the correctness of the establishment of the plantation and on the level of care in the first 3-4 years after planting. According to the Government Decision no. 418 of July 9, 2009

(2) [8], the establishment of viticultural plantations is carried out with the devirusated viticultural planting material of authorized biological category and not only of the "standard" category under the conditions of the Vine and Wine Law no. 57-XVII of March 10, 2006 (Article 8, paragraph 3) [12].

MATERIALS AND METHODS

In order to analyze the evolution of the viticultural sector and, namely of the table grape sector, the following indicators were used, such as the total area of vines (ha), the area of vines of table grapes (ha), the global harvest and average grape harvest (tonnes), export of table grapes (tonnes). At the same time, the technological data sheets for growing table grapes and input prices were analyzed. The period analyzed in this article was the years 2010 - 2019. The data collected from the National Bureau of Statistics, the Ministry of Agriculture and Regional Development and other institutions, were processed and interpreted statistically, building the trend line. At the same time, the necessary investments were determined for the vines from planting to fruiting. Were determined the profitability of the viticultural sector, namely for table grapes, the investment payback period.

The following research methods were applied in the scientific research process: the comparison method, the table method and the graphical presentation of the studied phenomena, the average size method, the relative size method, etc.

RESULTS AND DISCUSSIONS

The vitivincultural sector is and will remain an important one, where viticulture accounts for 3% of the country's GDP, but also that this branch represents 7% of total exports. High quality grapes and wine are the business card of our country, internationally recognized. The vitivincultural industry in the Republic of Moldova is one of the main branches of the country's economy, being an important source of income for the state budget. At the same time, the vitivincultural sector in the country

remains a job creator in rural areas, and the number of economic agents working in this field and registered in the Vitivincultural Register has reached 39,182, which includes natural persons, peasant farms, limited liability companies, joint stock companies, agricultural cooperatives.

The viticultural heritage in 2019 (in all categories of households) amounted to 126 thousand ha. The share of viticultural plantations on fruit varies between 92-95%. Wine varieties account for 80% [18].

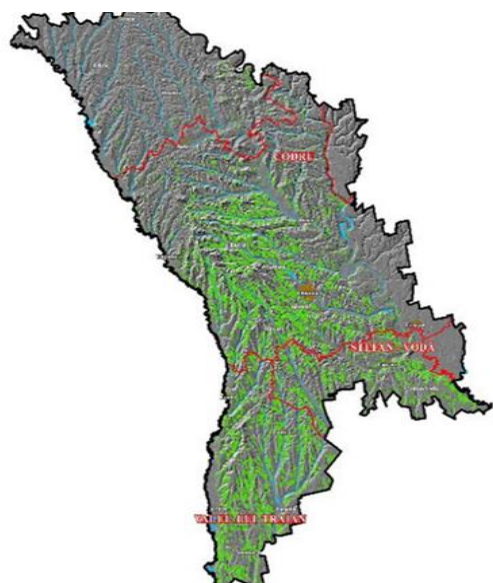


Fig. 1. Map of Vitivincultural sector in Republic of Moldova
Source: Google search [7].

In 2019, the total area of vines in Moldova was 126,000 ha, of which the surface of table grape varieties accounted for 18,900 ha, representing 15%.

The total grape harvest accounted for 659 thousand tonnes, of which table grapes 120 thousand tonnes, that is 18.2%.

The area registered in VVR was 34,000 ha (+13%), and the area of technical varieties 70,200 ha.

The vineyards with table grapes, in the last years, register a stability constituting on average 19.5 thousand ha. The share of vineyards for the table in total vineyards in 2019 was 15%. In recent years, there has been a slowdown in vine planting, but this trend does not apply to table grape plantations.

This is conditioned by the high demand for table grape consumption in regional markets. At the same time, it was due to the support policy of the state, in terms of support for both planting and post-harvest infrastructure. In 2019, according to the data of the National Bureau of Statistics, the area of vineyards of mass varieties is about 19 thousand ha.

In the Register of Plant Varieties of the Republic of Moldova are registered 73 table grape varieties. The share of table grape production in the total grape harvest is 17%.

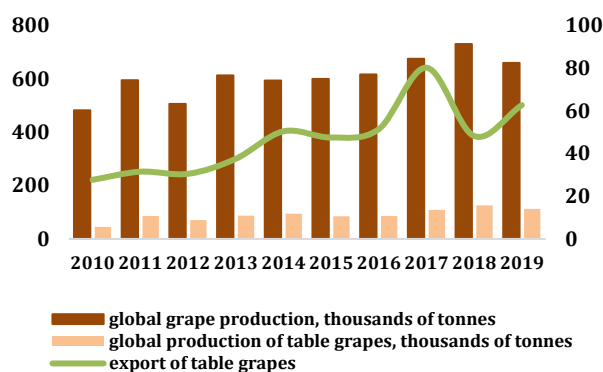


Fig. 2 Evolution of indicators for assessing the economic growth of the vitivincultural sector in the Republic of Moldova (in all types of households)
Source: National Bureau of Statistics [15].

The conducted research and the data analysis indicate that, on average, in dynamics, in the period of the years 2010-2019, the harvest of table grapes is increasing by 5.6%. The total quantity of grape production was relatively stable, remaining at a level of about 600 thousand tonnes per year, and the production of table grapes increased from 66.3 thousand tonnes in 2010 to 120 thousand tonnes in 2019.

In the Republic of Moldova, the global production of table grapes is 120 thousand tonnes with an average productivity of 5 t / ha of table grapes and exports about 60% of them.

Our country has begun to make progress in the export of table grapes, which are now in demand in over 30 countries around the world. Exports of table grapes are growing steadily to the EU, accounting for 30% of the volume.

The export of table grapes has doubled from 27.7 thousand tonnes in 2010 to 62.7 thousand

tonnes in 2019. The Russian Federation has the largest share in total grape exports, namely about 41%, Ukraine has a share of 12.4%.

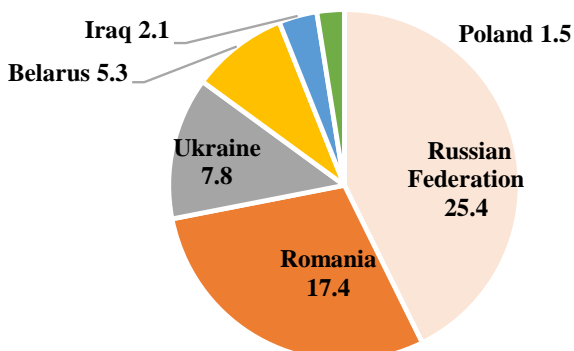


Fig. 3. The main destinations of table grapes, thousands of tonnes
 Source: East Fruit, 2020, [4].

Within the EU, the main market is Romania, where approx. 17.4 thousand tonnes were exported or about 28% of the total volume, followed by Poland with a share of 2.4% of the total volume, Latvia.

Other table grape importing countries include Iraq and Belarus. Exports of table grapes to both EU and CIS markets are growing.

In order to maintain this positive trend and the stability of export deliveries, it is important to continue to diversify markets and develop the efficiency of the table grape sector. And this is explained by the increased interest in quality production.

Producers and exporters of table grapes must constantly diversify their markets in order to be able to identify the markets with the best prices and minimize the risks in international trade [19].

According to *East-Fruit* estimates and data from *statistica.com*, in terms of the world's largest exporters of table grapes, worldwide, the Republic of Moldova ranks 15th, by the volume of fresh grapes exported.

At the same time, according to the volume exported per capita, the Republic of Moldova is included in the TOP 3 world exporters of table grapes (*East-Fruit*, 2020) [4, 13].

In addition to this, the Republic of Moldova offers the most competitive prices from the top 25 exporters in the world, reaching to the

control of 15% of the Russian table grape market.

Moreover, in recent years there have been significant successes in EU markets. Table grapes have even reached the market in the USA, Croatia, Great Britain.

In 2019, according to *World's Top Exports*, the Republic of Moldova, according to the value of grape exports (dollars), ranked 19th place. The value of exported grapes amounted to 48.2 million US dollars [14, 24].

Following the analysis of the structure of vineyards that are fruiting and the production obtained, we notice that the highest share belongs to the Southern Development Region - more than 47%, followed by ATU Gagauzia (24%), Center (23%), Chisinau municipality (6%), and in the northern region there are no climatic conditions regarding the cultivation of vineyards.

This is explained by the fact that in this area (South development region), table grapes are able to mature well and obtain better organoleptic qualities. In the case of table varieties, a high quality crop is obtained on well-heated terrains, with fertile and light soils, well aerated, with a high content of humus and nitrogen.

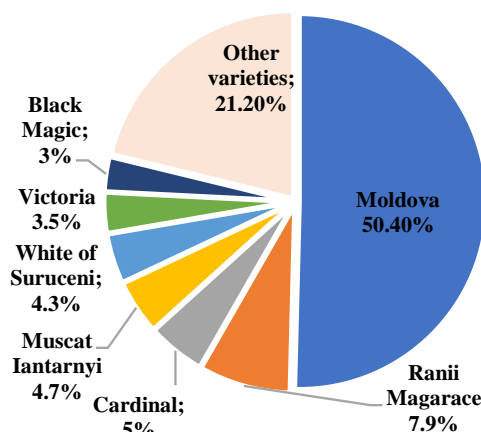


Fig. 4. The most widespread varieties cultivated in the Republic of Moldova
 Source: Table grapes marketing a vital need for market development and guaranteed access [19].

The trends of recent years are characterized by the establishment of vineyards with table varieties, which could be competitive in European markets.

Although the list of table varieties is quite varied, the assortment structure of the existing plantations is substantially unbalanced in favor of the *Moldova variety*, elaborated by Moldovan scientists over 30 years ago.

It is this that has largely contributed to the reputation of the Republic of Moldova abroad. *The Moldova variety*, taken as a whole by republic, occupies more than 50% and has 85% of all the structures of the variety in the country.

Also, it is a new opportunity for organic viticulture in Moldova [1, 3].

An important factor in the production of table grapes are the refrigerated spaces, which allow the storage of grapes. For example, we can keep *Moldova variety grapes* for up to 180 days. The technologies that are already implemented and the experience that Moldovan farmers have gives the possibility to keep the grapes harvested from September-October for a period of 6 months, at the same time their commercialization lasts an even longer period, because in the cold period of the year grapes have a high demand and enjoy advantageous prices.

In 2020, the market prices of table grapes are 10-15% higher compared to the same period of the previous year. This is due to the smaller grape harvest, following the spring calamities, but also to the summer drought, this year. Table grapes are sold in all markets in the Republic of Moldova, and the highest value of the average selling price was recorded in the central and northern areas of the country. The average price of a kilogram of white table grapes varies between 6-12 lei, and red table grapes sell for 10-13 lei / kg.

This business is considered profitable, even if we consider the increase in costs and lower yields due to factors such as: climatic conditions, varieties, applied technologies, grape quality, etc.

Establishment of plantations. When setting up vineyards that are oriented towards the production of table grapes, it is necessary to plant a wide range of varieties with a different ripening period. The productivity of the vineyards and the sustainability of their exploitation depend on the biological value of the planting material, on the correctness of the establishment of the plantation and on the level of care in the first 3-4 years after planting. When planting vines, planting material from highly productive virus-free clones is used.

In our case, for the establishment of the vineyard with table grapes and its care until fruiting (first 4 years) with a plantation area of 10 ha, are required capital investments in the amount of about 1.8 million lei (Table 1) [11]. The budget for the investments in the care of the vines until full fruiting (first 4 years), the investments are indicated (for each year) and are taken into consideration both the number and the market prices of the planting material necessary for the establishment and for the filling of post-planting gaps, as well as the costs (obviously in the form of market prices) of mineral or (where applicable) organic fertilizers, agricultural machinery, the composition and cost of plantation planting and care work during the period until fruiting etc., were carried out according to the indications from the Cost tariffs in agriculture [2].

Table 1. Investments for planting and care of vines 10 ha (thousand lei)

Cost items	Planting / 1 year of vegetation	Year II / total cost, lei	Year III / total cost, lei	Year IV / total cost, lei
Total material consumption	908,975	438,950.10	24,284.10	67,679.50
Total cost of mechanized operations	28,108	37,428.50	36,386.00	52,144.20
Total cost of manual operations, lei	10,887.3	5,095.94	8,485.54	8,536.74
c. Constant consumption:				
Duties and taxes	*	1,060.00	1,060.00	1,060.00
d. Direct consumption - total, lei	947,970.3	482,534.54	70,215.64	129,420.44
e. Indirect costs, lei	*	96,506.91	14,043.13	25,884.09
f. Total maintenance costs, lei	947,970.3	579,041.45	84,258.77	155,304.53

Source: Iațișin T. Timofti E., 2021, [11].

The optimal term of exploitation of the vineyards is conditioned by several variables, including, varieties, conditions of exploitation of the vineyards, soil quality. In most cases, this period is 15-20 years. The budget for the cultivation of table grapes (year V of vegetation, year I of harvest), constituted 419,374.2 lei (Table 2).

Table 2. Table grape growing budget (year V of vegetation, year I of harvest), calculation per 10 ha

Cost item	Year V	
	harvest of 9 t / ha	
	Units per 10 ha	Total cost yearly, lei
Net sales, lei	x	720,000
Table grapes, 8 lei / kg	90,000	720,000
Total material costs		59,853.40
Total cost of mechanized operations		55,337.63
Total cost of manual operations		15,533.09
C. Constant consumption		119,797.42
D. Direct costs - total, lei		250,521.54
E. Indirect costs, lei		50,104.31
F. Total maintenance costs, lei		300,625.85
F. Total net income, lei		419,374.15

Source: Iașișin T. Timofti E., 2021, [11].

According to Table 2, the average harvest of table grapes per hectare was 9 tonnes, the average selling price of grape production directly from the field being 8 lei/kg. According to the present calculations, we notice that the sum of sales revenues is about 720,000 lei and the total maintenance cost of the 10 ha vineyard is 300,625.85 lei. Following the calculations performed, *the annual profit obtained* from a vineyard of 10 ha *can reach a value* of 419,374.15 lei.

Important from the point of view of economic analysis for any capital investment, is the indicator the term of the investment return. The amount of investment required for the planting of 10 hectares of vineyards with table varieties and its maintenance for a period of 4 years until fruiting is 1,766,575 lei.

Based on the total amount of investments and the planned annual level of net profit, the term of their recovery will be 4.2 years (from the

beginning of fruiting or 8 years after planting the vineyard) for the entrepreneur, which is of practical interest for diversification of activities and income in rural areas.

Table 3. Main indicators, viticultural sector, table grapes

	1 ha	
1	Total investments, lei	176,657.5
2	Production costs, lei	30,062.6
3	Harvest, tonnes / ha	9
4	Unit cost, per tonne, lei	3,340.28
5	Unit price, per tonne, lei	8,000
6	Net sales, lei	72,000
7	Gross income, lei	41,937.4
8	Return on investment, years	4.2

Source: Iașișin T. Timofti E., 2021, [11].

The quality of a product, from an economic point of view, is conditioned by the costs related to the qualitative side of satisfying the needs of the consumers, by the degree of utility of the consumption value, etc. The economic aspect of quality as a category reflects the need to record costs not only in the production process, but also in the sphere of consumption (processing, exploitation).

CONCLUSIONS

The vitivincultural sector is and will remain an important one, demonstrated by the fact that viticulture accounts for 3% of the country's GDP, but also that this branch represents 7% of total exports. High quality grapes and wine are the business card of our country, internationally recognized.

The comparative approach of some indicators of the level of development and economic growth of the vitivincultural sector allows us to find that the performance of the sector in the Republic of Moldova, in dynamics, in the years 2010-2018, registered an average annual growth of 6.2% - productivity of the vineyard on fruit; 8.4% - table grape harvest; 7.1% - export of table grapes;

The highest pressure, in terms of costs, is attested during the establishment of the vineyard (year I-IV). Only for the planting of vines on an area of 10 ha, the costs represent 947,970.3 lei, so that, subsequently, until year V (the first year of harvest), the total value of

the expenses will reach the amount of 1,766,575 lei. Thus, the future entrepreneur, who has decided to start a business in the given sphere, must be sure that he owns or can obtain the *necessary investments*.

In order to maintain the performance of the sector, it is recommended that entrepreneurs growing table grapes do the following:

- set up plantations with competitive varieties;
- making investments in processing infrastructure and post-harvest operations by creating refrigerated warehouses, thus creating conditions for the sale of grapes in the cold period and obtaining an advantageous price;
- specialization of table grape producers in this crop;
- application and use of specialized technologies for the production of table grapes;
- the use of fertilizers (mineral fertilizers and microelements for foliar fertilization), which contribute considerably to increasing the harvest and quality of grapes; the traceability of grapes and the strict record of phytosanitary preparations and fertilizers (correct record in the Register of Evidence);
- the association of farmers producing table grapes in associations in order to promote / defend their interests and their cooperation for the commercialization of grapes under more advantageous conditions.

The creation of an efficient and competitive vitivinicultural sector in the Republic of Moldova involves the support of economic agents in this sector through various *economic and financial instruments and levers*.

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