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ESTIMATING THE ECONOMIC EFFICIENCY OF MEDICINAL CROPS

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Abstract

Medicinal plants have an important economic potential but which is not capitalized at fair value, so farmers choose certain crops that have reliable market. The paper analyzes from the point of view of economic efficiency, basil, thyme, lavender and hyssop crops. In this regard, the budget of revenues and expenditures for 2020 for these crops was estimated. For this study it was used the technical-economic analysis, determining the main economic indicators: value of production, total costs, variable costs, indirect costs, income, production cost, predictable domestic market price.

Key words**:** *basil, thyme, lavender, hyssop, economic efficiency*

INTRODUCTION

Since ancient times, natural therapy have been a form of medicine, used to treat various diseases. Medicinal plants are used in the pharmaceutical industry, and the knowledge gained has been passed down from generation to generation [7, 8]. Although medicine has evolved a lot over time, people still address to these forms of treatment, having an important role through the action of active substances and principles [2, 9]. Used both in spontaneous or cultivated flora, medicinal plants are used for both internal and external use. In recent times, consumers are interested in organic products, so that the areas cultivated in this way have expanded, both for plants used in the food industry, but also for those used in the pharmaceutical or cosmetics industry. Regarding the benefits of using medicinal plants to the disservice of medicines, it is counted that they are better received and tolerated by the body, and the side effects are fewer or do not manifest [3, 10, 11].

Due to the favorable climate and soil conditions, Romania has over 900 species of medicinal and aromatic plants with high pharmaceutical and food value. The active principles of medicinal plants change if they are exposed for a long time to high temperatures, and if harvesting, drying and storage are done in inappropriate conditions, a large part of the active principles is lost [1, 4, 6].

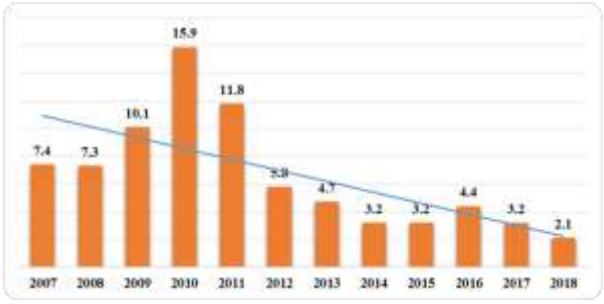

Fig. 1. Evolution of the area cultivated with medicinal and aromatic plants in Romania (thousand hectares)
Source: Ministry of Agriculture and Rural Development, Accessed on 23.05.2020 [5].

As can be seen in the chart number 1, the area cultivated with medicinal and aromatic plants in 2007 was about 7,400 hectares, reaching a maximum in 2010 with an area of 15,900 ha, double the area cultivated in 2007. If starting with 2007 the trend was an ascending one until 2010, after this period the evolution of

the surface cultivated with medicinal and aromatic plants entered a decline, registering at the end of 2018, only 2,100 hectares.
Although the cultivation of medicinal and aromatic plants requires fewer resources consumed in the cultivation technology, the interest shown for these species has decreased significantly, most farmers turning to the cultivation of plant species easier to capitalize.

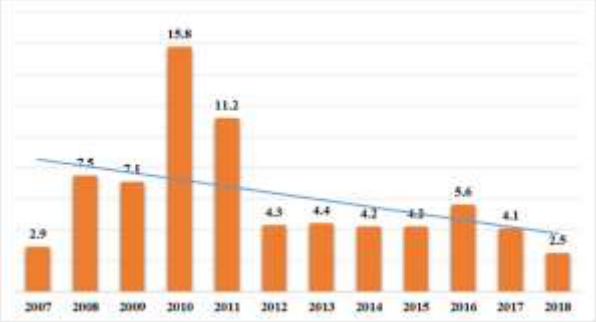

Fig. 2. Evolution of the total production of medicinal and aromatic plants in Romania (thousand tons)
Source: Ministry of Agriculture and Rural Development, Accessed on 23.05.2020 [5].

Regarding the total production of medicinal and aromatic plants (Fig.2), for the period 2007 - 2018, it had an oscillating trend, ranging from 2,500 tons in 2018 and a maximum of 15,800 tons in 2010, the productions being determined by the pedoclimatic conditions, surfaces, but also by the types of crops and the varieties used.

MATERIALS AND METHODS

The paper is part of the ADER sector project 25.1.2. "Research on the development and testing of technical equipment for harvesting medicinal and aromatic plants, used in small farms". In this paper was used the method of technical-economic analysis, determining the structure of the budget on culture, with detailed presentation of some main elements: Production value, Subsidies, Gross product, Intermediate consumption, Taxable income, Net income, Net income + subsidies, Taxable income rate, Net income rate + subsidies, Production cost, Predictable domestic market price

RESULTS AND DISCUSSIONS

At an average production estimated at 13,000 kg/ha, a production value of 160,160 lei/ha is achieved, and by adding to it the subsidy of 3,410.6 lei/ha, a gross product of 163,570.8 lei/ha is obtained (Table 1.).

Table 1. Revenue and expenditure budget for Thyme (conventionally grown in the field) - calculations per hectare - 2020 harvest (estimated production - 13 t)

No. Crt.	Indicators	U.M.	Value	
			Lei	Euro (exchange 4.8)
1	Production value	lei	160,160.30	33,366.7
2	Subsidies	lei	3,410.60	710.5
3	Gross product	lei	163,570.80	34,077.3
4	Total expenses	lei	128,128.20	26,693.4
5	Variable expenditure	lei	86,824.60	18,088.5
6	Fixed expenses	lei	41,303.60	8,604.9
7	Taxable income	lei	32,032.10	6,673.4
8	Net income + subsidies	lei	32,239.40	6,716.5
9	Rate is taxable	%	25	5.2
10	Net income rate + subsidies	%	25.2	5.3
11	Production cost	lei/t	9,856.00	2,053.3
12	Predictable internal market price	lei/t	12,320.00	2,566.7

Source: own calculations.

Variable expenses hold 67.8% of the total, being made up of 84% of value consumption with materials and materials. Holding a proportion of 32.2% of total expenditure, fixed expenditure is represented by 85.8% of value consumption with permanent labor (Table 1). By deducting the total expenses from the value of the production, a taxable income of 32,032 lei/ha results, finally

obtaining a net income of 28,828.8 and an income rate of 25% (Table 1).

As a suggestive synthetic indicator for the degree of economic efficiency with which the thyme crop is obtained (conventional system), the production cost of 9,856 lei/ton is calculated by dividing the total costs by the estimated average production (Table 1).

Thyme cultivation becomes profitable by establishing a predictable market price of 12,320 lei/ton, calculated by multiplying the production cost by a coefficient of 1.25 (Table 1). The largest part of production costs is focused on materials and materials, so that for the estimate of the harvest for 2020, they represent 67% of total production costs, followed by manual labor costs with a share of 32%, and mechanical works have only 1% of total expenses (Fig. 3.).

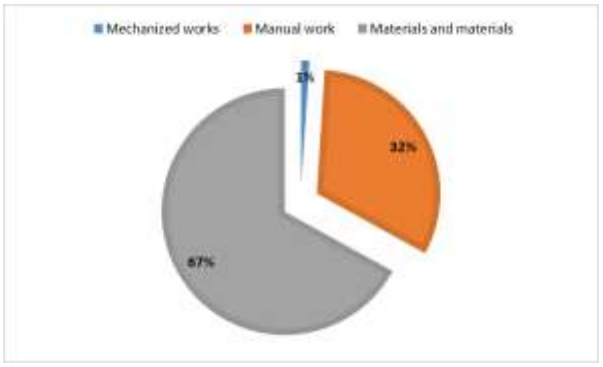

Fig. 3. Percentage distribution of the main expenditure incurred following the preparation of the framework estimate for Thyme cultivation (2020 harvest estimates)
Source: own calculations.

Table 2. Income and expenditure budget for Basil (cultivated in the field in a conventional system) - calculations per hectare - harvest 2020 (estimated production - 12 t)

No. Crt.	Indicators	U.M.	Value	
			Lei	Euro (exchange 4.8)
1	Production value	lei	140,346.40	29,238.83
2	Subsidies	lei	3,410.60	710.54
3	Gross product	lei	143,757.00	29,949.38
4	Total expenses	lei	112,277.20	23,391.08
5	Variable expenditure	lei	88,363.90	18,409.15
6	Fixed expenses	lei	23,913.30	4,981.94
7	Taxable income	lei	28,069.30	5,847.77
8	Net income + subsidies	lei	28,672.90	5,973.52
9	Rate is taxable	%	25	5.21
10	Net income rate + subsidies	%	25.5	5.31
11	Production cost	lei/t	9,356.40	1,949.25
12	Predictable internal market price	lei/t	11,695.50	2,436.56

Source: own calculations.

At an average production estimated at 12,000 kg/ha, a production value of 140,346 lei/ha is achieved, and by adding to it the subsidy of 3,410.6 lei/ha, a gross product of 143,757 lei/ha is obtained (Table 2.).

Variable expenses hold 78.7% of the total, being made up of 80% of value consumption with materials and materials. Holding a proportion of 21.3% of total expenditures, fixed expenditures are represented by 77.6% of value consumption with permanent labor (Table 2). By deducting the total expenses from the value of the production, a taxable income of 28,672.9 lei/ha results, finally obtaining a net income of 25,262.4 lei and an income rate of 22.5%. As a suggestive synthetic indicator for the degree of economic efficiency with which the basil crop is obtained (conventional system), the production cost of 9,356.4 lei/ton is calculated by dividing the total costs by the estimated average production (Table 2.).

Basil culture becomes profitable by establishing a predictable market price of 11,695 lei/t, calculated by multiplying the production cost by a coefficient of 1.25 (Table 2). The largest part of production costs is concentrated on materials and materials, so that for estimating the harvest for 2020 for the basil, they accounted for 80% of total production costs, followed by manual labor costs 19%, and mechanical works holding only 1% of total expenses (Fig. 4).

Table 3. Revenue and expenditure budget for Lavender (field cultivation in conventional system) - calculations per hectare - harvest 2020 (estimated production - 2 t)

No. Crt.	Indicators	U.M.	Value	
			Lei	Euro (exchange 4.8)
1	Production value	lei	21,642.40	4,508.83
2	Subsidies	lei	3,410.60	710.54
3	Gross product	lei	25,052.90	5,219.35
4	Total expenses	lei	17,313.90	3,607.06
5	Variable expenditure	lei	3,621.00	754.38
6	Fixed expenses	lei	11,297.10	2,353.56
7	Taxable income	lei	4,328.50	901.77
8	Net income + subsidies	lei	7,046.50	1,468.02
9	Rate is taxable	%	25	5.21
10	Net income rate + subsidies	%	40.7	8.48
11	Production cost	lei/t	8,656.90	1,803.52
12	Predictable internal market price	lei/t	10,821.20	2,254.42
13	Annual share of start-up costs (25 years of operation)	lei/ha	2,395.70	499.10

Source: own calculations.

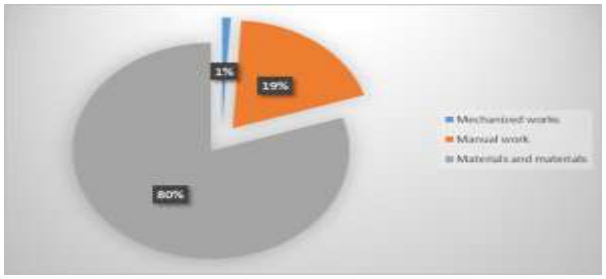

Fig. 4. Percentage distribution of the main expenditures incurred following the preparation of the framework estimate for the Basil crop (2020 harvest estimates)
Source: own calculations.

At an average production estimated at 2,000 kg/ha, a production value of 21,642 lei/ha is achieved, and by adding to it the subsidy of 3,410.6 lei/ha, a gross product of 25,052.9 lei/ha is obtained (Table 3).
Variable expenses hold 20.9% of the total, being made up of 77.5% of value consumption with materials and materials. Holding a proportion of 65.2% of the total expenses, the fixed expenses are represented in a percentage of 95% by the value consumptions with permanent labor, the rest of the expenses representing the annual quota related to the establishment expenses (25 years of operation), in amount of 2,395.7 lei/ha (Table 3).
By deducting the total expenses from the value of the production, a taxable income of 4,328.5 lei/ha results, finally obtaining a net income of 3,635.9 lei and an income rate of 21%.
As a suggestive synthetic indicator for the degree of economic efficiency with which the lavender crop is obtained - conventional system, the production cost of 8,656.94 lei/ton is calculated by dividing the total costs by the estimated average production (Table 3).
Obtaining the profitability of the lavender crop, becomes profitable by establishing a predictable market price of 10,821.2 lei/to, calculated by multiplying the production cost by a coefficient of 1.25 (Table 3).

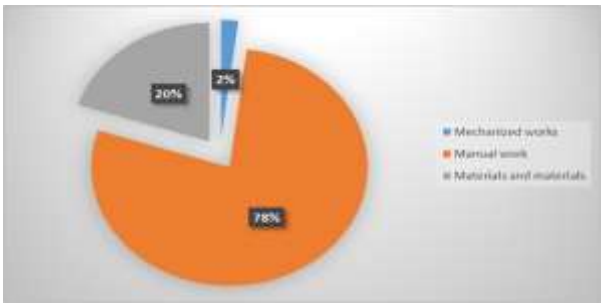

Fig. 5. Percentage distribution of the main expenses incurred following the preparation of the framework estimate for Lavender culture - 2020 harvest estimates
Source: own calculations.

The largest share of production costs is concentrated on manual work, so that for estimating the harvest of lavender crops for 2020, they accounted for 78% of total production costs, followed by expenditure on materials and materials, in percentage of 20%, and mechanized works holding only 2% of total expenditures (Figure 5).
At an average production estimated at 1,500 kg/ha, a production value of 20,467.5 lei/ha is achieved, and by adding to it the subsidy of 3,410.6 lei/ha, a gross product of 23,878.1 lei/ha is obtained (Table 4).
Variable expenditures hold 21.4% of the total, being made up of 77.1% of value consumption with materials and materials. Holding a proportion of 54% of the total

expenses, the fixed expenses are represented in a percentage of 94,6% by the value consumptions with permanent labor force, the rest of the expenses representing the annual quota related to the establishment expenses (15 years of operation), in amount of 4,031.4 lei/ha (Table 4).

By deducting the total expenses from the value of the production, a taxable income of 4,093.5 lei/ha results, finally obtaining a net income of 3,438.5 lei and an income rate of 21%.

Table 4. Revenue and expenditure budget for Hyssop (conventional crop - calculations per hectare - harvest 2020 (estimated production - 1.5 t)

No. Crt.	Indicators	U.M.	Value	
			Lei	Euro (exchange 4.8)
1	Production value	lei	20,467.50	4,264.06
2	Subsidies	lei	3,410.60	710.54
3	Gross product	lei	23,878.10	4,974.60
4	Total expenses	lei	16,374.00	3,411.25
5	Variable expenditure	lei	3,503.10	729.81
6	Fixed expenses	lei	8,839.50	1,841.56
7	Taxable income	lei	4,093.50	852.81
8	Net income + subsidies	lei	6,849.10	1,426.90
9	Rate is taxable	%	25	5.21
10	Net income rate + subsidies	%	41.8	8.71
11	Production cost	lei/to	10,916.00	2,274.17
12	Predictable internal market price	lei/to	13,645.00	2,842.71
13	Annual share of start-up costs (25 years of operation)	lei/ha	4,031.40	839.88

Source: own calculations.

As a suggestive synthetic indicator for the degree of economic efficiency with which the hyssop culture is obtained - conventional system, the production cost of 10,916 lei/ton is calculated by dividing the total costs by the estimated average production (Table 4).

Obtaining the profitability of hyssop cultivation becomes profitable by establishing a predictable market price of 13,645 lei/ton, calculated by multiplying the production cost by a coefficient of 1.25 (Table 4).

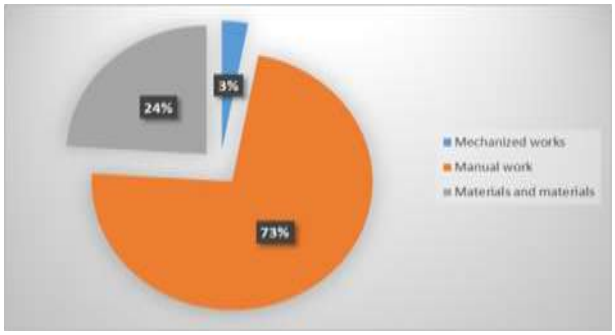

Fig. 6. Percentage distribution of the main expenditure incurred following the preparation of the framework estimate for Hyssop cultivation - 2020 harvest estimates

Source: own calculations.

The largest share of production costs is concentrated on manual work, so that for the estimate of the 2020 crop of hyssop, they accounted for 73% of total production costs, followed by material and material costs of 24%, and mechanized works holding only 3% of total expenses (Fig. 6).

CONCLUSIONS

In 2007 the cultivated area with medicinal plants was 7,400 hectares, reaching a maximum of the analyzed period in 2010, when the cultivated area was 15,900 hectares. After this period, the area cultivated with medicinal and aromatic plants decreased, due to the lack of processing units.

Regarding the yields obtained, they alternate depending on the species and variety grown, the area, but especially the soil and climatic conditions that can significantly influence the yields obtained.

Following the estimates of the budget of revenues and expenditures for the analyzed medicinal plant crops, it was possible to determine the following:

-At an average production of Thyme estimated at 13,000 kg/ha, a production value of 160,160 lei/ha is achieved. Thyme culture becomes profitable by establishing a predictable market price of 12,320 lei/ton.
-At an average production of Basil estimated at 12,000 kg/ha, a production value of 140,346 lei/ha is achieved. Basil culture becomes profitable by establishing a predictable market price of 11,695 lei/ton.
At an average production of Lavender estimated at 2,000 kg/ha, a production value of 21,642 lei/ha is achieved. The Levantica culture becomes profitable by establishing a predictable market price of 10,821.2 lei/ton.
At an average production of Hyssop estimated at 1,500 kg/ha, a production value of 20,467.5 lei/ha is achieved. Hyssop cultivation becomes profitable by establishing a predictable market price of 13,645 lei / ton.

ACKNOWLEDGEMENTS

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