

Original Article

Economic Efficiency Factors of Kale Crop in Transylvania

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Abstract

Knowledge of economic efficiency is vital for a farmer, be it vegetables, cereals etc. Economic efficiency is the balance between costs and revenues. Kale is a vegetable rarely cultivated in our country and is practically nonexistent in markets, but the United States of America and even in Western Europe is increasingly promoted due to high nutritional values. The production cost of this vegetable is slightly higher than that of the cabbage, because it is very little cultivated in our country and the seed must be purchased from western countries. This paper presents data production obtained from two hybrids of kale under the influence of multi-phase fertilization and costs. After analyzing the data it was concluded that chemically fertilized F1 Winterbor hybrid obtained the largest production with a profit rate of 50.5% and unfertilized F1 Redbor obtained a negativ rate of profit - 20.23%.

Keywords: kale, multi-phase fertilization, production, economic indicators, profit rate.

1. Introduction

The outcome in vegetable production process depend not only on the volume and quality of products obtained, but in a high measure of the market. Selling price of fresh vegetables is highly variable depending on the following factors: seasonality of production, leading to a wide variation in the supply, high diversity of products and geographical character of supply and demand, quality expressed by physical characteristics (shape, color, size, uniformity) and the state of integrity, freshness, tenderness and health, quality standards requirements, the cost price of the product [3].

Although in gardening, manual work costs, mechanical and material costs are high, the high yields obtained per area unit and the high selling prices contribute to a significant revenue [3].

Production promote activities in vegetable crops covers a range of objectives from selecting the varieties, hybrids, that will grow, following with estimates design and crop assessment ends with economic and financial results [4].

Kale is a vegetable rarely cultivated in our country and non-existent, unfortunately, in markets. Although it is a vegetable with high nutritional value, even higher than the regular cabbage grown and consumed all over the country [1].

Most data on the price of kale are from the United States of America.

Thus, these rates vary between 2 and 3 dollars per 0.5 kg, fresh kale [7, 8]. The price of this vegetables as processed product varies significantly (table 1).

These prices are only informative and indicative, as they have to be adapted to the economy of our country. Since the cost of production differs as well from that in the United States of America.

Thus, following will be an analysis in terms of economic efficiency of the kale crop in Romania.

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Table 1. Kale - Average retail price per 0.5 kg, 2008 [5]

Form	Average retail price
Fresh ¹	\$2.19
Frozen ²	\$1.51
Canned ³	\$0.93

¹Includes products sold in a bag or clamshell, such as cut and chopped kale; excludes random weight kale, kale sold on a count basis, and bunches.

²Includes all forms of frozen kale, such as cut leaf and chopped.

³Includes plain kale and kale with seasonings like onion, garlic, or pork broth; excludes buttered canned kale greens.

2. Materials and Methods

Economic efficiency is evaluated on data which is the balance between costs and revenues. In assessing efficiency, economics are using methods based on statistical comparisons, which results in so-called economic efficiency indicators.

Economic efficiency indicators are calculated to highlight the effectiveness of using different experimental technologies and cultivars, in terms of production.

To calculate economic efficiency the culture technological sheet is drawn where all production costs are found.

These constitute the basis of the calculation of the following economic indicators: unit cost, unit profit, profit rate, labor productivity and production costs [6].

This paper analyzes the economic efficiency of two hybrids of kale (F1Winterbor and F1Redbor) which were multi-phase fertilized with cattle dung, poultry manure and chemical fertilizer (NPK complex, 15 : 15 : 15 ratio). The experience was bifactorial with eight variables (table 2).

Table 2. Experimental variants

Variant symbol	Factor A – the fertilizer	Factor B – the hybrid
V1	Unfertilized	Winterbor F1
V2	Unfertilized	Redbor F1
V3	Cattle dung	Winterbor F1
V4	Cattle dung	Redbor F1
V5	Poultry manure	Winterbor F1
V6	Poultry manure	Redbor F1
V7	Chemical	Winterbor F1
V8	Chemical	Redbor F1

The cattle manure was applied after being diluted with water in a ratio of 1:9 and left to soak for 2 days. The poultry manure was applied after being diluted with water in a ratio of 1 : 15 and left to soak for 7 days.

Two multi-phase fertilizations were applied, by fert-irrigation, at an interval of two weeks, the first fertilization being made one month after planting [1].

3. Results and Discussions

Correct determination of production costs requires assessing each item of expenditure, which are highlighted in the kale technological culture sheet in semi-mechanized crops.

In the first part of the sheet the necessary material costs to establish culture are shown and in the second part can be found the labor costs (table 3). These data are needed for the calculation of tracked economic indicators [2].

Table 3. Technological sheet after which economic indicators were calculated

No.	Expenditure items	lei/ha	%
Material expenses			
1.	Materials from its own sources	150	1.06
2.	Purchased materials	3418	24.05
3.	Supply costs	362	2.54
4.	Mechanical work expenses	202	1.42
5.	Value of water for irrigation	950	6.68
6.	Amortization of fixed assets	-	-
7.	Tax on agricultural income	-	-
8.	Other material expenses (1%)	51	0.36
I. TOTAL material costs		5133	36.11
LABOUR EXPENSES			
1	Manual work expenses	6921	48.71
2	Contributions to social insurance (20.8%)	1280	9.01
3	Contributions to Health Insurance (5.2%)	360	2.53
4	Contributions to the unemployment fund (0.5%)	35	0.24
5	Contributions to the risk and accidents fund (0.205%)	14	0.10
6	Unique National Fund (0,85%)	59	0.41
II. TOTAL labour expenses		8668	61.01
TOTAL direct expenses (I + II)		13801	97.13
Indirect costs (8%)		1104	7.77
TOTAL production expense (CT)		14905	100.00
Main production expenses		14905	100.00

(Source: Pocol Cristina, 2009) processing own results.

Previously presented data in the technology sheet (table 3) are specific for unfertilized variants, regardless of cultivar. For other variants the total costs are shown, both in terms of labor and materials but also in indirect costs in table 4. It should be noted that the use of two different hybrids did not involve additional costs. This study is based on comparative analysis of revenue and expenditure for a hectare of crop and results obtained in the experimental variants production [2]. Analyzing data on total obtained production which were statistically analyzed using analysis of variance can be seen that all fertilized variants obtained statistically assured differences that were very significant and distinct.

The highest values being obtained, as expected for chemically fertilized variants.

As the analysis of data presented in table 5 shows the efficiency of kale crops is directly influenced by experimental factors. Comparing the two hybrids is easy to see that F1 Winterbor whether

or not fertilized gets a higher production than F1Redbor.

Regarding chemically fertilized variants, even if the costs are higher the yields cover these amounts, even yielding a high profit of 0.54 lei per kg, while the price is 1 leu/kg.

Table 4. Total cost of production for each experimental variant

Variant		Total production (t/ha)	Production costs (lei/ha)			
Fertilizer	Variety		Materials	Labour	Total direct	Overall
Unfertilized	Winterbor F1 (Mt)	28.6	5133	14905	18501	19981
Unfertilized	Redbor F1 (Mt)	21.5	4293	14208	18501	19981
Cattle dung	Winterbor F1	32.7**	4578	14350	18928	20442
Cattle dung	Redbor F1	25.6**	4578	14350	18928	20442
Poultry manure	Winterbor F1	37.4***	4752	14586	19338	20885
Poultry manure	Redbor F1	30.2***	4752	14586	19338	20885
Chemical	Winterbor F1	48.8***	4915	14796	19711	21287
Chemical	Redbor F1	39.6***	4915	14796	19711	21287
DL/LSD (p 5%)		0.27				
DL/LSD (p 1%)		0.39				
DL/LSD (p 0.1%)		0.60				

Table 5. Economic efficiency factors of kale crop based on experimental variants

Variant	Production		Purchased price (lei/kg)	Variable cost		Profit	
	Physics (t/ha)	Global Thousand (t/ha)		Total (lei/ha)	Units (lei/kg)	Total (lei/ha)	Unitar (lei/kg)
V1	28.6	25.32	0.9	21641.04	0.76	1146.96	0.14
V2	21.5	20	0.9	21641.04	1.01	-3641.04	-0.11
V3	32.7	30.5	0.9	21911.04	0.67	5538.96	0.23
V4	25.6	24.6	0.9	21911.04	0.86	228.96	0.04
V5	37.4	32.4	1	22039.56	0.59	10360.44	0.41
V6	30.2	28.7	1	22039.56	0.73	6660.44	0.27
V7	48.8	45.05	1	22300.92	0.46	22749.08	0.54
V8	39.6	37.2	1	22300.92	0.56	14899.08	0.44

Profit rate is shown in fig. 1. From this graph we can see very clearly that the profit rate recorded the highest values for chemically fertilized variants 50.5% for F1Winterbor hybrid and 40.05% for F1Redbor, because these variants achieve the highest yields.

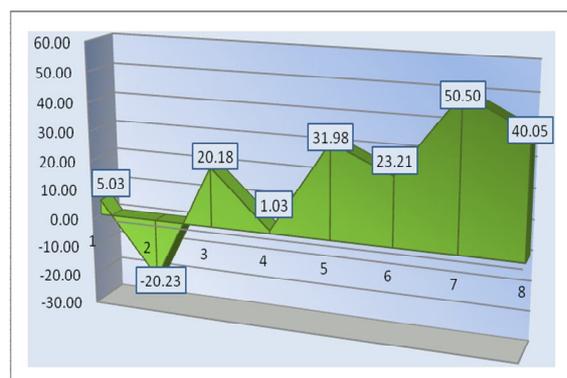


Figure 1. Profit rate recorded by each variant

In the unfertilized variant of F1 Redbor, the rate of return has a negative value of - 20.23%.

4. Conclusions

The analysis performed on the data presented above we can draw the following conclusions:

Highest yield was obtained and used for most of the variants fertilized with NPK complex (15:15:15), followed by variants fertilized with poultry manure. Also for these variants were obtained the highest production costs.

Highest profit was recorded for version 7, in which the F1Winterbor hybrid was chemically fertilized, it has a value of 50.5% and the lowest rate of return (-20.23) was recorded for F1Redbor unfertilized hybrid.

Establishing a culture of kale, using F1 Redbor hybrid which is not fertilized, it is not profitable. Because the rate of return is negative and has a value of -20.23%.

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