

A COMPARATIVE STUDY CONCERNING ECONOMIC EFFICIENCY FOR VARIOUS LEVELS OF MILK YIELD

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Abstract

This paper aimed to present a comparative study concerning the analysis of the economic efficiency in dairy farming in close relationship to milk yield performances. Two milk yield levels /cow/year were taken into consideration as follows: V1-4,000 kg milk and V2 – 6,500 kg milk . For each variant , the following specific indicators were calculated : gross product, variable, fixed and total production costs, gross margin and profit. The V1 variant registered Euro 1,932.64 total production costs, Euro 912.68 gross margin and Euro 787.5 profit while the V2 variant recorded Euro 1.575.72 total production costs , Euro 457.46 gross margin and Euro 366.47 profit. As a conclusion , the increase of milk yield assures the growing up of economic efficiency in terms of gross margin and profit.

Key words : efficiency , dairy farming , gross margin

INTRODUCTION

Economic efficiency in Dairy Farming is conditioned by breed raised in the farm and its production potential, fodder quality and quantity according to dairy cows requirements for life maintenance, production level, pregnancy, technology for cow rearing and cost optimization. Various research results shows that the increase of milk yield requires higher production costs. It is definitely true, but higher productions leads also to higher returns, gross margin and farmer's profit [4,5,6,7,8]. Gross Margin is considered the barometer of economic efficiency in Dairy farms , as well as in any agricultural farm according to the EU provisions. It allows the comparison of various activities, for instance in a dairy farm between fodder and milk producing. Also it shows if a cow is more efficient than another one, according to milk yield registered per year and lactation. Taking into account the large range of farm size and production level in the Romanian dairy farming, practical guides for farmers have been issued and published , where farmers could find various models of technologies in close relationship to their farm size and profile but also the corresponding

calculations concerning gross product, production costs and gross margin for different milk yield, farm size and type : private households, family associations and commercial companies [1,4,10]. Gross margin calculation imposes the determination of gross product, coming from marketed milk, calf, culled cow and resulted manure) , variable costs (feeding, heifer for cow replacing, medicines and treatments, veterinary services, artificial insemination, labor, land rent, interest related to working capital and other costs), which are subtracted of gross product. It is also compulsory to aggregate cow growing with fodder producing in dairy farms in order to establish the economic efficiency at farm level [2, 3, 9].

MATERIAL AND METHOD

The research work was carried out within two dairy farms raising Black and White Spotted Breed in the plain area , as follows: V1 – 6,500 kg milk yield per year with 4.1% fat and 3.6 % protein , 600 kg cow live weight ; V2 - 4,000 kg milk yield per year with 3.8 % fat and 3.3. % protein, 550 kg cow live weight. The cows are milked 4 years, 25 % cows are culled every 4 years,

the calving interval is 385 days . The calves are raised till the weight of 80 kg and then are sold for Euro 1.16 per kg live weight. The culled cow is delivered for Euro 0.93 per kg live weight to the slaughterhouse . For every farm, the following indicators were calculated: variable costs (replacing heifer, cow and calf feeding, artificial insemination, energy , watering, fuels, insurances, taxes to cattle breeders association, family labor, land rent, interest related to working capital), fixed and general costs (fixed assets depreciation and maintenance, insurances, interest related to borrowed fixed capital, other costs), total production costs . The economic efficiency was comparatively analyzed by yield level based on gross product, production costs, gross margin, profit per cow and year, profit per milk kilogram, profit rate. All the calculation were made in Euro per cow for the year 2008.

RESULTS AND DISCUSSIONS

Gross Product.

Gross product consists of incomes coming from the delivered milk, calf sold at 80 kg live weight , culled cow delivered at 550 kg live weight and manure, all this income items calculated at market price . The farm V1 registered Euro 2,720.14 gross product, of which: 66.90 % from delivered milk, 3.23 % from calf, 20.51 % from the culled cow, 5.06 % from manure and 4.30 % from Government subsidies.

The farm V2 recorded Euro 1,962.19 gross product, by Euro 757.95 (27.87 %) less than the farm V1. The share of various gross product items was : 57.07 % milk, 4.48 % calf, 26.06 % culled cow, 6.44 % manure and 5.15 % subsidies.

The calculation of gross product for the both experimental variants is presented in Table 1.

Table 1
 Comparison concerning Gross Product (Euro /cow/year) by milk yield level
 Comparatie privind produsul brut pe niveluri de productie (euro/vaca/an)

Specification Specificare	MU	V1			V2			V1-V2 Euro
		Quantity Cantitate	Price Pret Euro/ MU	Value Valoare Euro	Quantity Cantitate	Price Pret Euro/ MU	Value Valoare Euro	
Milk Production Productia de lapte	Kg/cow/ Year	6,500	0.28	1,820	4,000	0.28	1,120	+700.00
Calf Vitel	Kg	80	1.16	87.97	80	1.16	87.97	-
Culled cow Vaca reformata	Kg	600	0.93	558	550	0.93	511.50	+46.50
Manure Gunoii				137.89			126.44	+11.45
Subsidies Subventii				116.28			116.28	-

Feeding Costs .

Feeding costs are presented in Table 2. The level of this cost item depended on the diets established by farmer for dairy cows and calves, according to the condition in the farm. The diet structure, quantity of forages and quality are the key factors determining the production level and feeding costs, which are an item of production costs. In the farm V1, feeding costs registered Euro 1,329.83

Euro, being by Euro 233.04 (21.24%) higher than in case of the farm V2, where this cost item recorded Euro 1,096.79 per cow and year. In the both farms, the calves consumed 500 kg milk and 40 kg combined fodder. The following amounts of fodders have been consumed in the year 2008 : in the farm V1 : 9,000 kg green grass, 1,800 kg corn silage, 450 wheat straw, 1,440 kg hay, 438 kg wheat bran, 1,095 kg concentrates and 50 kg salt; in

the farm V2 : 8,100 kg green grass, 1,500 kg wheat bran, 730 kg concentrates and 40 kg corn silage, 360 kg straw, 1,080 kg hay , 365 salt.

Table 2
 Comparison concerning Feeding Costs by milk yield level (Euro/cow/year)
 Comparatie privind cheltuielile cu furajarea pe niveluri de productie (euro/vaca/an)

Specification Specificare	V1	V2	V1-V2
Calf feeding Hranirea vitelului	154	154	-
Cow feeding, of which: Hranirea vacii, din care:	1,175.83	937.79	+238.04
- green grass -masa verde	217.60	195.90	+21.70
-corn silage -siloz de porumb	266.40	222.00	+44.40
-wheat straw -paie de grau	30.60	24.48	+6.12
-hay -fan	263.88	197.90	+65.98
-wheat bran -tarata de grau	214.96	174.94	+35.02
- farm concentrated mix -amestec concentrate de ferma	178.24	118.82	+59.42
-salt -sare	4.15	3.75	+0.40
Feeding Cost Cheltuieli de furajare	1,329.83	1,096.79	+233.04

Production Costs by experimental variant are presented in Table 3.

Biological material Cost. The cost of replacing heifer was Euro 145.25 /year in case of V1 by Euro 29 (24.94 %) higher than in case of V2, taking into account as the heifer was purchased for Euro 581 and respectively Euro 465 in the year 2008. Heifers have to be descendants of high breeding value cows and bulls in order to assure the genetic gain in the population . The pedigree determines heifer market price.

Medicines and veterinary services counted for Euro 36.16 in case of V1 and Euro 24.41 in case of V2. In the farm V1, the higher production cows were facing with mastitis which increased medicine cost by 48.13 %.

Artificial Insemination counted for Euro 15 in the farm V1 and respectively Euro 13 per cow and year in the farm V2 .

Energy, water and fuel Cost registered Euro 32.64 in case of V1 and Euro 26.49 in

case of V2. In the farm V1, this cost item was by Euro 6.15, respectively 23.21 % higher.

Insurance, membership fee to cattle breeders association, other taxes counted for Euro 80 in the both farms.

Labor Cost. In the both farms, works are done by the farmer's family members. For estimating this cost item , a monthly salary of Euro 140, meaning Euro 0.82 per hour was taken into consideration. A number of 105.30 hours were necessary per cow and year in the farm V1 and, respectively 89.82 hours in the farm V2. As a result, labor cost was Euro 86.34 in the farm V1, by Euro 12.69 (17.23 %) higher than in case of the farm V2.

Land Rent counted for Euro 50 per cow in the farm V1 (0.5 ha arable land /cow) and Euro 45 per cow in the farm V2 (0.45 ha arable land per cow). In the area, rent level was Euro 100 /ha in the year 2008.

Interest related to working capital counted for Euro 32.24 in case of V 1 and Euro 29.14 in case of V2.

Variable costs registered Euro 1,807.46 in case of V1 and Euro 1,504.73 in case of V2, as one can see from Table 3. In the farm V1, variable costs were by Euro 302.73 (20.11%) higher than in the farm V2.

Table 3
 Comparison concerning production costs (Euro/cow/year) by milk yield level
 Comparatie privind cheltuielile de productie pe niveluri de productie (euro/vaca/an)

Specification Specificare	V1	V2	V1-V2
Replacing Heifer Juninca de inlocuire	145.25	116.25	+29.00
Feeding Hranire	1,329.83	1,096.79	+233.04
Artificial Insemination Insamantarea artificiala	15.00	13.00	+2.00
Energy, water, fuel Energie, apap, combustibili	32.64	26.49	+6.15
Insurance, taxes Asigurari , taxe	80.00	80.00	-
Labor Forta de munca	86.34	73.65	+12.69
Land rent Arenda terenului	50	45	+5
Interest related to working capital Dobanda aferenta capitalului circulant	32.24	29.14	+3.10
Variable Costs Cheltuieli variabile	1,807.46	1,504.73	+302.73
Fixed assets depreciation , maintenance and insurance Amortizarea, intretinerea si asigurarile pentru activele fixe	196.80	196.80	-
Interest related to fixed assets Dobanda aferenta capitalului fix	111.25	111.25	-
Administration and other general costs Cheltuieli de administratie si alte cheltuieli generale	12.46	12.46	-
Fixed and general costs Cheltuieli fixe si generale	320.51	320.51	-
PRODUCTION COSTS CHELTUIELI DE PRODUCTIE	1,923.64	1,595.72	+336.92
Productions Costs related to Milk Yield Cheltuieli de productie aferente productiei de lapte	1,700.72	1,420.19	+280.53

Fixed and general Costs recorded Euro 320.51 in the both farms, including fixed assets depreciation and maintenance, as well as insurance for cow sheds and installations , administration and other items.

Total Production Costs registered Euro 1,832.64 in the farm V1 and Euro 1,585.72 Euro in the farm V2.

The indicators of the economic efficiency are presented in Table 4.

The production costs related to milk yield counted for Euro 1,700.72 in the farm V1 and Euro 1,420.19 in the farm V2.

Milk Cost was Euro 0.26 per kg in case of V1 and Euro 0.35 in case of V2.

The financial result. The farm V1 registered 0,02 profit /kg milk and 7.6 % profit rate, while the farm V2 recorded Euro 0.07 Loss/kg milk and - 20% loss rate.

Gross Margin was Euro 912.68 /cow and year in case of V1 and Euro 457.46 Euro in case of V2. Therefore, the farm V1 where milk yield is 6,500 kg per cow registered a double gross margin compared to the farm

V2 where the cows delivered just 4,000 kg per year.

Profit per cow was Euro 787.50 in case of V1 and Euro 366.47 Euro in case of V2 .

Profit rate was 40.74 % in case of V1 and 22.96 % in case of V2 (Table 4).

Table 4
 Comparison concerning economic efficiency by yield level
 Comparatie privind eficienta economic ape niveluri de productie

Specification Specificare	V1	V2	V1-V2
Gross Margin (Euro/cow/year) Marja bruta (euro/vaca/an)	912.68	457.46	455.22
Profit (Euro/cow/year) Profit (euro/vaca/an)	787.50	3.66.47	+421.03
Profit rate /cow/year (%) Rata profitului pe vaca si an	40.74	22.96	+17.78
Milk Cost (Euro/kg) Costul unitary al laptelui (euro/kg)	0.26	0.35	- 0.09
Milk Price (Euro/kg) Pretul laptelui (euro/kg)	0.28	0.28	-
Profit per milk kg (Euro/kg) Profit pe kg de lapte (euro/kg)	+0.02	-0.07	-0.09
Milk Profit rate % Rata profitului la lapte	7.60	-20.00	- 27.60

CONCLUSIONS

1. At present in Romania, 4,000 kg milk yield per cow and year does not assure any profitability in milk producing, because milk cost is Euro 0.36 per kg extremely higher compared to milk price, which is just Euro 0.28 /kg. As a results, dairy farmers have to raise cows giving more than 6,000 kg milk per year in order to assure milk production profitability. In this case, milk cost is a little bit lower than milk price .

2. In case of the farm V1, the increase of milk yield from 4,000 kg to 6,500 kg per cow, meaning 2,500 kg/cow and year has led to additional production costs counting for Euro 336.92 compared to the farm V2. This is not a negative aspect, on the contrary , it shows the increase of economic efficiency. The increase production cost rhythm was lower (21 %) compared to the increase milk production rhythm which was 62.50 %.

3. Gross margin recorded by the farm V1 was two times higher compared to the gross margin registered by the farm V2. This aspect was conditioned by the additional milk yield of 2,500 kg per cow and year .

4. In order to increase economic efficiency, farmers have to raise high production potential dairy cows milking more than 6,000 kg milk per year and to assure high quality fodder and sufficient from a quantitatively point of view.

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