

Research Concerning Standard Gross Margin Depending on Yield in Dairy Farming

Ion Pirvutoiu¹, Agatha Popescu²

¹*Hyperion University Bucharest, 030615-Bucharest, Calarasilor, 169, Romania*

²*University of Agricultural Sciences and Veterinary Medicine Bucharest
011464-Bucharest, Marasti, 59, Romania,*

Abstract

The paper aimed to establish gross margin for three levels of milk yield/cow/year under the condition of Romania: V1-4,000 kg, V2-5,000 kg and V3-6,000 kg. The technical data were collected from three dairy farms and the economic calculations were based on the EU methodology taking into consideration prices of the year 2011. The following indicators were determined for each level of milk yield: gross product, variable cost and gross margin. The estimates for gross margin/cow were Lei 1,927 for the variant with the smallest milk yield, Lei 2,561 for the variant with the middle yield and Lei 3,454 for the variant with the highest milk yield. As a conclusion, gross product and variable cost were directly influenced by milk yield and the higher the milk yield, the higher gross margin and economic efficiency per cow. In order to increase farm financial performance expressed by gross margin and profit, farmers have to rise milk yield per cow using high productive animals, sufficient and high quality forages and keep production cost, mainly variable cost under control.

Keywords: dairy farming, gross margin, milk yield

1. Introduction

Economic efficiency in dairy farming is influenced by milk yield. Despite that average milk production as continuously increased in Romania, it is still far away from the performance registered by the countries with a highly developed milk producing sector in the EU as mentioned by Draghici et. al. [1].

The economic analysis of the results carried out in dairy farming is based at present on the EU methodology which takes into consideration gross margin as an economic criterium, expressed in monetary terms per cow and year as presented by Draghici et. al. [1], Popescu Agatha [2].

Gross margin is directly influenced by gross product including marketed milk, culled cow, calf and manure and also by variable cost consisting of

replacing heifer, cow and calf feeding, water, electricity, medicines and veterinary services etc as mentioned by Popescu Agatha[3].

Gross margin is closely related to milk yield, a reason to conclude that the higher milk yield, the higher economic efficiency in a dairy farm as mentioned by Ursu Ana et. al. [4].

Milk yield and the number of cows represent the key technical factors which determine farm profitability. In this context, the paper aimed to estimate gross margin for three milk yield levels based on the technical data collected from three farms situated in Arges and Calarasi counties. The methodology provided by the EU was used for calculating gross product, variable cost and gross margin. These estimates are destined as models for farmers in order to show them how important is milk production level/cow in assuring farm economic efficiency [5].

* Corresponding author: Agatha Popescu
Tel: +40 21 318 2564/232, Fax: +40 21 3182888
Email: agatha_popescu@yahoo.com

2. Materials and methods

In order to set up this paper, it was needed to collect data from three dairy farms of different sizes situated in the Southern part of Romania in Arges and Calarasi counties as follows: Farm F1 registered about 4,000 kg of milk in average per cow and year from its 22 cows, Farm F2 performed about 5,000 milk yield/year from its 55 cows and Farm F3 recorded 6,000 kg milk/cow from 132 cows.

Based on these information, the following specific indicators characterizing economic efficiency in dairy farming have been estimated per cow and year: **gross product** including incomes coming from marketed milk, calf, culled cow, manure and subsidies, **variable cost** consisting of replacing heifer, calf and cow feeding, hooves cutting, water and electricity, medicines, treatments and other veterinary services, other materials, cow insurance, **gross margin**, according to the EU formula:

$SGM=GP-VC$, where SGM=standard gross margin, GP=gross product, VC=variable cost [5]. In this purpose, the prices available for the year 2011 were used. Finally, the comparison between gross margin estimates per cow and year was made between the three level of milk production in order to put into evidence how closely related is gross margin to milk yield and

how important is for farmers to increase milk production.

3. Results and discussion

Gross product by milk yield

For 4,000 kg milk per cow and year (V1), gross product estimate counted for Lei 8,479/cow and year. About 70.8% income comes from marketed milk, 4.1 % from sold calf, 7.4% from culled cow, 12.9% from manure and 4.8% from subsidies. In the year 2011, milk was marketed at Lei 1.5/kg, calf at Lei 4.3/kg live weight, culled cow at Lei 5/kg live weight, manure at Lei 50/Ton.

For 5,000 kg milk/cow/year (V2), gross product counted for Lei 10,144/cow/year, being by 19.63% higher than in case of V1. The difference of Lei 1,665 came from milk, culled cow and manure. Therefore, the share of various income sources in gross product was: 74% milk, 3.4% calf, 6.8% culled cow, 11.8% manure, 4% subsidies.

For 6,000 kg milk/cow/year (V3), gross product reached Lei 11,804, being by 39.21% higher compared to V1 and by 16.36 % higher compared to V2. The share of various income sources in gross product was: 76.2% milk, 2.9% calf, 6.4% culled cow, 11% manure, 3.5% subsidies (Table 1).

Table 1. Gross product by milk yield

Specification	V1 4,000 kg milk/cow/year, 500 kg live weight			V2 5,000 kg milk /cow/year 550 kg live weight			V3 6,000 kg milk /cow/year 600 kg live weight		
	Quantity Kg/cow/year	Price Lei/kg	Income Lei	Quantity Kg/cow/year	Price Lei/kg	Income Lei	Quantity Kg/cow/year	Price Lei/kg	Income Lei
Milk yield (kg/cow/year)	4,000	1.50	6,000	5,000	1.50	7,500	6,000	1.50	9,000
Calf (heads)	80	4.3	344	80	4.3	344	80	4.3	344
Culled cow (25 % culling rate)	125	5.0	625	138	5.0	690	150	5.0	750
Manure (Tons)	22	50	1,100	24	50	1,200	26	50	1,300
Gross Product	-	-	8,069	-	-	9,734	-	-	11,394
Subsidies	-	-	410	-	-	410	-	-	410
Gross Product with subsidies	-	-	8,479	-	-	10,144	-	-	11,804

Cow feeding cost by milk yield. For each level of production, it was established the corresponding diet taking into account nutrients requirements for cow live weight, production and pregnancy. In general, ratio was based on silage, succulent forages, hay, concentrated feedstuff, wheat bran and salt. In Table 2 are presented the quantities for

each forage needed to be consumed by a cow and feeding cost during a year by milk yield.

For 4,000 kg milk per cow and year (V1), feeding cost counted for Lei 4,527. **For 5,000 kg milk/cow/year (V2)**, feeding cost was Lei 5,408, by 19.46% higher compared to V1. **For 6,000 kg milk/cow/year (V3)**, feeding cost was Lei 6,060,

by 33.86 % higher compared to V1 and by 12.05 % higher compared to V2. (Table 2).

Variable cost by milk yield

For 4,000 kg milk per cow and year (V1), variable cost was Lei 6,552, of which feeding 69%, calf feeding till 80 kg live weight 18.3%, replacing heifer 5%.

For 5,000 kg milk per cow and year (V2), variable cost counted for Lei 7,583, of which 72.2 % cow feeding, 15.8% calf feeding, 5.6% replacing heifer. In this case, for an additional 1,000 kg milk/cow/year from 4,000 kg to 5,000 kg milk, variable cost was higher by 15.73% in comparison with V1.

For 6,000 kg milk per cow and year (V3), variable cost was Lei 8,350, of which 72.5% cow

feeding, 14 calf feeding, 6% replacing heifer. For an additional 1,000 kg milk from 5,000 kg to 6,000 kg, variable cost increased by 10.11%. For an additional 2,000 kg milk from 4,000 kg to 6,000 kg, variable cost increased by 27.4% (Table 3).

Gross margin by milk yield

For 4,000 kg milk per cow and year (V1), gross margin counted for Lei 1,927 and the share of gross margin in gross product was 22.72%.

For 5,000 kg milk per cow and year (V2), gross margin reached Lei 2,561, being by 32.9% higher than in case of V1. The share of gross margin in gross product counted for 25.24%.

Table 2.Cow feeding cost by milk yield

Specification	V1 4,000 kg milk/cow/year, 500 kg live weight			V2 5,000 kg milk /cow/year 550 kg live weight			V3 6,000 kg milk /cow/year 600 kg live weight		
	Quantity Kg/cow/year	Price Lei/kg	Cost Lei	Quantity Kg/cow/year	Price Lei/kg	Cost Lei	Quantity Kg/cow/year	Price Lei/kg	Cost Lei
Silage	9,125	0.15	1,369	10,950	0.15	1,643	11,680	0.15	1,752
Suculent forages	3,650	0.18	657	4,380	0.18	788	4,745	0.18	854
Hay	1,460	0.75	1,095	1,460	1.0	1,095	1,460	1.0	1,095
Concentrated feedstuff	1,100	10	1,100	1,460	1.0	1,460	1,825	1.00	1,825
Wheat bran	365	0.80	292	510	0.80	408	650	0.80	520
Salt	40	0.35	14	40	0.35	14	40	0.35	14
Total feeding cost	-	-	4,527	-	-	5,408	-	-	6,060

Table 3.Variable cost by milk yield (Lei)

Specification	V1 4,000 kg milk/cow/year,	V2 5,000 kg milk /cow/year	V3 6,000 kg milk /cow/year
	Replacing heifer (25 % culling rate)	325	425
Cow feeding	4,527	5,408	6,060
Calf feeding	1,200	1,200	1,200
Hooves Cutting	150	150	150
Electricity and water	130	150	170
Treatments, veterinary services and artificial insemination	100	130	150
Other materials	50	50	50
Insurance	70	70	70
VARIABLE COST	6,552	7,583	8,350

For 6,000 kg milk per cow and year (V3), gross margin reached Lei 3,454, being by 34.9% higher than in case of V2 and by 79.2% higher than in

case of V1. The share of gross margin in gross product counted for 29.29% (Table 4).

Table 4.Gross margin by milk yield (Lei)

Specification	V1 4,000 kg milk/cow/year,	V2 5,000 kg milk /cow/year	V3 6,000 kg milk /cow/year
	Gross product	8,479	10,144
Variable cost	6,552	7,583	8,350
Gross margin	1,927	2,561	3,454
Share of Gross margin in Gross Product (%)	22.72	25.24	29.29

Farm size by milk yield in the three farms

Taking into account the number of dairy cow that each farm had in the year 2011, it was estimated gross margin at farm level, which counted for Lei 42,394 for V1, farm with 4,000 kg average milk production, for Lei 140,855 for V2, 5,000 kg milk yield and for Lei 455,928 for V3, 6,000 kg milk

yield/cow/year. In this case, gross margin was influenced by the number of dairy cows besides the level of milk yield. As a result, the economic size of each farm was: ESU 4.20 for V1, ESU 13.97 for V2 and ESU 45.23 for V3, classifying them into: small farm, middle sized farm and large sized farm (Table 5).

Table 5. Farm size by milk yield

Specification	M.U.	V1-4,000 kg milk/cow/year	V2-5,000 kg milk/cow/year	V3-6,000 kg milk/cow/year
Number of dairy cows/farm	Heads	22	55	132
Gross margin	Lei/cow/year	1,927	2,561	3,454
	Lei/farm/year	42,394	140,855	455,928
	Euro/farm/year	10,093	33,536	108,534
Economic farm size	ESU	4.20	13.97	45.23
Farm classification	-	Small farm	Middle farm	Large farm

4. Conclusions

An increase by 1,000 kg milk yield from 4,000 to 5,000 kg average production per cow could assure an additional gross product of Lei 1,665. An increase by 1,000 kg milk per cow and year from 5,000 to 6,000 kg average milk production could bring an additional income counting for Lei 1,660 and from 4,000 kg to 6,000 kg milk could assure an additional income of Lei 3,325. Therefore, the higher production, the higher gross product.

An increase by 1,000 kg milk yield from 4,000 to 5,000 kg average production per cow lead to an increased variable cost by Lei 1,031. An increase by 1,000 kg milk per cow and year from 5,000 to 6,000 kg average milk production could bring an additional variable cost of Lei 767. Therefore, the higher the milk yield, the higher variable cost.

Gross product could increase by Lei 634 for an increased milk yield by 1,000 kg from 4,000 to 5,000 kg/cow/year and by Lei 893 Lei for an increased milk yield by 1,000 kg from 5,000 to 6,000 kg/cow/year.

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