

ANALYSIS OF MILK PRODUCTION AND ECONOMIC EFFICIENCY IN DAIRY FARMS

ANALIZA PRODUCTIEI DE LAPTE SI EFICIENTEI ECONOMICE IN FERMELE DE VACI

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The paper aimed to present some aspects regarding milk production and farm size and their relationship to economic efficiency in dairy farming. For this purpose, three variants of farm size have been taken into consideration as follows: F1- raising 12 dairy cows whose milk yield is 3,500 kg /cow/lactation; F2- raising 50 dairy cows whose milk yield is 5,000 kg /cow and year and F3 – rearing 150 dairy cows, producing 6,000 kg milk per cow/year. For each variant, the following economic parameters have been determined: gross product, variable costs, fixed costs, gross margin, gross and net profit, profit rate and other specific indicators of economic efficiency such as: milk yield, milk cost, cost /cow/year, profit/cow, profit rate /cow, income /cow, profit/farm and profit rate at farm level. In conclusion, the higher the farm size and milk yield, the higher gross margin, net profit and profit rate .

Keywords: analysis , milk production, economic efficiency , dairy farming

Introduction

Dairy farming is an important sector of Romania's agriculture . Romania has an important potential as milk producer and processor , despite that farm structure is not corresponding one . Between 1990 and 2000 , the cow stock decreased during and total milk production as well. The most of farms are in fact households raising 1-2 cows and producing mainly for family needs and rarely selling the additional milk in the free market. Just a few farms can be considered commercial farms raising more than 15-20 cows and are well endowed with milking machines and tanks for milk storage and cooling , enabling them to produce high quality milk as required. Romania has to fulfill a milk quota of 3.057 million tons, of which 1.093 million tons to processors and the remaining of 1.964 million tons as direct delivery in the free market. The only positive aspects during the last 19 years is the continuous increase of milk yield which at present

has exceeded 4,000 kg per cow and year .Taking into account the milk importance for human being , animals and milk processing sector and also the requirements imposed by Romania's integration into the E.U. , it is necessary to establish a new strategy for the development of dairy farming . Dairy farm structure is close related to the economic efficiency , being well known the fact that the higher the farm size and milk yield , the higher the economic efficiency.

In this context, the paper presents an analysis of milk production in various farms of different herd size and also the main aspects of economic efficiency in order to put in evidence the importance of farm size and milk yield for increasing profitability and competitiveness in dairy farming.

Materials and Methods

The paper presents three variants of herd size : F1 – raising 12 dairy cows whose milk yield is 3,500 kg /cow/lactation; F2 - raising 50 dairy cows whose milk yield is 5,000 kg /cow and year and F3 – rearing 150 dairy cows , producing 6,000 kg milk per cow/year. For each variant , the following economic parameters have been determined : gross product, variable costs, fixed costs, gross margin, gross and net profit, profit rate and other specific indicators of economic efficiency such as: milk yield, milk cost, cost /cow/year, profit/cow, profit rate /cow, income /cow, profit/farm and profit rate at farm level. Calculations are made in current prices of the year 2007. Gross Margin recorded by each type of farm was compared to Standard Gross Margin provided by EuroStat in order to establish in what kind of category each farm could be classified , in other words how Romanian dairy farms business could be quoted compared to the EU standards (ESU : less than 8 = very small, 8 – 40 small, 40 -100 medium , 100 - 200 large and over 200 very large). Calculations are made in Euro.

Results and Discussion

Gross Product varied between Euro 13,426 in the farm raising 12 cows and Euro 233,896 in the farm growing 150 cows. Of course, Gross Product has been influenced both by the number of cows, milk yield/cow/year and milk price , the number of calves delivered in the market, their live weight and market price per live weight , the number of culled cows , their live weight and market price and manure production and its market price, subsidies . But, the main income came from milk , as it is normal to be so in a dairy farm. Therefore, the higher the herd size and the higher milk yield , the higher the Gross Product as presented in Table 1.

Table 1

Gross Product by Farm Size and Milk Yield				
Specification	MU	F1	F2	F3
Dairy Cows	heads	12	50	150
Milk Yield	Kg/cow/year	3,500	5,000	6,000
Total Milk Production	kg	42,000	250,000	900,000
Total Production Value at farm level, of which :	Euro	12,014	69,583	246,249
- Milk Production Value	Euro	10,500	62,500	225,000
Subsidies	Euro	1,412	5,882	17,647
Gross Product	Euro	13,426	75,465	233,896

Variable Costs followed a similar trend, increasing from a farm to another according to farm size and average milk yield. A higher production per cow always requires higher feeding, veterinary services and other related costs. The value of variable costs was: Euro 9,682 for F1, Euro 50,412 for F2 and Euro 169,129 for F3. Feeding keeps the highest share within Variable Costs: 75.48% for F1, 77.36% for F2 and 75.44% for F3 (Table 2).

Table 2

Variable Costs by Farm Size and Milk Yield (Euro/farm)			
Item Cost	F1	F2	F3
Feeding	7,308	39,000	127,597
Replacing Heifer	412	1,962	7,059
Electricity	316	727	1,879
Veterinary Services	275	1,250	3,971
Other materials	177	735	2,206
Supplying	488	2,620	8,861
Part time labor	0	0	3,438
Insurances	706	4,118	14,118
Variable Costs	9,682	50,412	169,129

Fixed Costs registered an increasing trend also from the small farm to the largest one: Euro 1,979 for F1, Euro 9,350 for F2 and Euro 22,595 for F3 (Table 3).

Production Costs have followed the same increasing trend from the small farm raising 12 cows to the largest farm rearing 150 cows: Euro 11,661 for F1, Euro 59,762 for F2 and Euro 191,724 for F3. Of the total production costs, milk production costs represented 86.99% in case of F1, 88.14% in case of F2 and 88.91% in case of F3.

Table 3

Item Cost	F1	F2	F3
Full time labor	1,263	5,039	8,024
General costs	170	874	2,923
Interest	34	216	795
Fixed assets depreciation	512	3,221	10,853
Fixed Costs	1,979	9,350	22,595

Gross Margin recorded de the following values: Euro 3,744 per farm in case of F1 , Euro 25,053 per farm in case of F2 and Euro 64,767 in case of F3.

Gross Profit registered an increasing trend according to the herd size as follows: Euro 1,765 in case of F1 , Euro 15,703 in case of F2 and Euro 42,172 in case of F3.

Net Profit , resulting after subtracting income tax from gross profit , registered the following values : Euro 1,483 for F1 , Euro 13,191 for F2 and Euro 35,424 for F3.

Table 4

Specification	F1	F2	F3
Gross Product	13,426	75,465	233,896
Variable Costs	9,682	50,412	169,129
Gross Margin	3,744	25,053	64,767
Fixed Costs	1,979	9,350	22,595
Gross Profit	1,765	15,703	42,172
Profit Tax	282	2,512	6,748
Net Profit	1,483	13,191	35,424
Total Production Costs , of which:	11,661	59,762	191,724
Production Costs related to Milk Production	10,145	52,678	170,475

Economic Efficiency registered the highest level in the largest dairy farm F3, taking into account milk yield (6,000 kg/cow/year), milk cost (Euro 0.19 /kg), cost per cow/year (Euro 1,278) , income per cow /year (Euro 1,559), profit per farm/year (Euro 42,172). Looking at the levels of the efficiency indicators presented in Table 5 we can see that the higher the herd size and the higher the milk yield , the higher the economic efficiency , except profit per cow and profit rate. The highest profit per cow , Euro 314 , was noticed in the middle sized farm raising 50 cows and the highest profit rate per cow , 26.27 % and the highest profit rate per farm , 26.28 % , as well .

Table 5

Economic Efficiency in Dairy Farming by herd size and milk yield

Specification	MU	F1	F2	F3
Milk Yield	Kg/cow/year	3,500	5,000	6,000
Herd size	Heads	12	50	150
Milk Cost	Euro/kg	0.24	0.21	0.19
Cost /cow/year	Euro/cow	972	1,195	1,278
Profit/cow	Euro/cow	147	314	281
Profit rate /cow	%	15.12	26.27	21.98
Income/cow	Euro/cow	1,119	1,509	1,559
Profit/farm	Euro	1,765	15,703	42,172
Profit rate at farm level	%	15.14	26.28	22.00

Comparison with the European Union Standard Gross Margin. Taking into account that the economical farm size is Euro 1,200 , the resulting economic size of each farm was : 3.12 ESU for F1 , 20.87 ESU for F2 and 53.97 ESU for F3 , showing the difference of size business among the analysed farms. The interpretation of these results is shown in Table 6.

Table 6

Comparison with the EU Standard Gross Margin

Specification	F1	F2	F3
Gross Margin/farm/year	3,744	25,053	64,767
Number of ESU	3.12	20.87	53.97
Interpretation of farm business	Very small	Small	Medium

Conclusions

1. The higher the farm size and milk yield , the higher gross margin, net profit and profit rate .

2. The farm raising 12 cows , producing 3,500 kg milk /head/year has recorded 3.12 ESU which shows that its business is very small according to the EU standards. This means that small farms of such a type are not profitable.

3. The farm raising 50 cows , producing 5,000 kg milk /cow/year has a small business , because it registered 20.87 ESU.

4. The farm raising 150 cows , producing 6,000 kg milk/head yearly has a medium business size according to the EU standards.

5. As final conclusion, farm size is still very small in Romania and does not allow higher economic performance expressed in gross margin and profit . Milk production has to be over 6,000 kg per cow/lactation and farm size has to vary between 50 and 150 dairy cows to classify farm business in a medium class according to the EU standards.

6.The increase of economic efficiency in dairy farming depends on the increase of milk yield and herd size. In this respect , farmers have at their disposal a lot of means such as : balanced feeding close related to cow live weight and milk yield, the utilization of bull pressure by using artificial insemination with frozen semen from high breeding value bulls , selective cow culling , creation of larger sized farms in order to allow the implementation of modern technologies assuring a high milk quality , a higher milk price , a high labor productivity and farm competitiveness.

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