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CONSIDERATIONS REGARDING THE CRITERIA OF EFFICIENCY FOR THE CLASSIFICATION OF DAIRY FARMS

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Abstract

The paper aimed to present several criteria for dairy farms classification using a sample of 8 dairy farms from the Southern Romania whose data were collected for the year 2013. The most important indicator characterizing farm efficiency and size is milk yield because it is has a direct impact on gross margin or profit. Milk production cost should be also taken into account, as it is has a negative impact on the financial results. The application of the point method placed twofarms on the top position: F5 and F3, each one getting 45 points for the criteria taken into account. However, the farm F5 came on the 1st position for milk yield, marketed milk yield, gross product from milk, total gross product per cow and year and gross margin/cow/year and on the 7th position for variable costs, while the farms F3 came on the 3rd position for milk yield and variable cost, on the 2nd position for gross product from milk, total gross product per cow and year, and standard gross margin, and on the 1st position for heifer cost and own mechanical works as well. As a conclusion, dairy farmers should keep under control all the production cost items looking for measures to reduce costs as much as they can without affecting yield performance. Under an increased competition, farmers should pay attention to all the factors stimulating the growth of milk yield, as the higher milk production, the higher financial results.

Key words**:** *classification criteria, dairy farms, point method, standard gross margin*

INTRODUCTION

Farm classification is very important for farmers in order to stimulate them to improve their performance under the continuous competition growth.

Most of authors consider that in dairy farming, farm size is given by the number of dairy cows [11]. Other authors consider that farm size is given by milk production or standard output [8, 18], others' opinion is that farm size is based on gross margin [6,17,19]. What is recognized by every author is the fact that farm classification or hierarchy depends on their financial results: gross margin or profit and that the optimum farm size is a mixture between the technical and economic optimum level which are still a subject enough controversial as long as they do not fit each other [13,15].

This controversial situation is created by the fact that clear and correct criteria to evaluate farm performance and position are not yet established, because there are so many restraining factors with a deep influence on the financial results in dairy farming [2].

Milk yield is determined both by genetic factors, such as: individuality, cow breed, age, body shape and weight, constitution, udder size and shape, breeding value of the bulls used in artificial insemination and environment factors such as: geographical position of the farm, possibilities to produce forages in the farm as much as the farmer is able to do so that just a few forages to be bought from the market and only what is really needed, grazing opportunities, feeding system, a balanced diet regarding the content of protein and starch, vitamins and microelements, reproduction system, cow age at the first calving and lactation, calving interval, season and month of calving, milking system, length of lactation, housing and comfort factors: resting bed, temperature, air moisture, wind currents, cow movement and hygiene conditions, weather conditions etc.[5,12, 14, 16].

Profit is a function of the amount of delivered

milk in the market, production cost per milk kg and milk price [13]. Marketed milk is a function of milk production obtained per cow and year and milk used for feeding calved till the weaning age. Milk price is conditioned demand/offer ration in the milk market and milk quality in terms of fat percentage, protein percentage, acidity, density, content of germs, somatic cells etc. [10].

Milk production cost depends on all the cost items with a direct influence of milk production. In this category one can mention: feeding cost with the highest share in total production cost, cost of the heifer used for replacing the culled cow in close relationship with culling percentage applied by farmer, heifer breeding value determined by its mother cow and father bull, heifer market price, cost of labor force, veterinary services involving cost of medicines, treatments, cost of artificial insemination involving the price per frozen semen varying according to the bull breeding value for milk production, tariff per insemination service, water consumption and tariff per cubic meter, electricity consumption and tariff per Kwh, fuel and lubricants, land rental, repairs of shed installations and equipment for milking, watering, food distribution, manure collection etc, depreciation of fixed assets (cow sheds, milking parlor, milk tank, installation of manure evacuation, watering installation etc) [21,22].

Also, milk production cost is divided into two categories of costs: variable costs, varying at the same time with production and fixed costs (depreciation, taxes, interest etc), which do not affect milk production, but only the financial results in term of profit. For this reason, it is recognized that the most important part of cost is the variable cost represented mainly by feed cost, replacement cost and labor cost [20]

For this reason, during the last decade, the EU established gross margin and standard gross margin as a barometer of farm efficiency and also a basis for farm classification according to the economic size unit (ESU= Euro 1,200) [6, 17,19].

Recently, the EU changed its opinion about the criteria of farm classification and introduced the gross production standard, as an average during a period of five years [9].

In this context, the paper goal was to evaluate farm performance based on the indicators taken into consideration for gross margin calculation, but the comparison between dairy farms to be based on the number of points received for each indicator according to the points method. The hypothesis the study started is that the application of the pint method could lead to the same results as the gross margin method. In this way, farm classification could be more precisely taking into consideration more criteria.

MATERIALS AND METHODS

A number of 8 dairy farms from the Southern Romania were included in this experiment. With the farmers support, the data were collected for the year 2013 from the farm book-keeping.

The economic indicators taken into consideration were the following ones: milk yield (kg/cow/year), marketed milk yield (kg/cow/year), milk price (Euro/kg milk), gross product from milk (Euro/cow/year), calf weight at delivery (kg/head) and price per kilogram live weight (Euro/kg), gross product from sold calf (Euro/cow/year), culling percentage (%), cow live weight at the culling moment (kg/cow), price per kg cow live weight (Euro/kg), gross product from sold culled cow (Euro/cow/year), amount of manure collected from cow per year (cubic meters/cow/year) and manure market price (Euro/cubic meter), gross product from cow manure collection (Euro/cow/year), total gross product (Euro/cow/year), variable cost items such as: feed cost in terms of Euro/cow/year (determined using cow daily diet and price per kg of each feed component), cost of the replacing heifer, taking into account the culling rate and the heifer market price (Euro/cow/year), cost of own mechanical works (Euro/cow/year), cost of veterinary services, electricity, water consumption, artificial insemination (Euro/cow/year), total variable cost (Euro/cow/year).

Based on the value of these indicators, it was

calculated gross margin, SGM, in terms of Euro/cow/year, as a difference between gross product per cow and year, GP, and variable cost per cow and year, VC, according to the formula: SGM = GP-VC.

Based on the data collected for these indicators from the 8 dairy farms, it was calculated the average, standard deviation and variation coefficient according to the formulas: [4,23]

Average), $A = \frac{X_1 + X_2 + ...X_n}{n}$, (1)

where n = number of farms and X= economic indicator (milk yield, marketed milk, etc)

Standard Deviation, $S = \left(\sqrt{\frac{\sum_{i=1}^{n} (X_i - \overline{X})^2}{n-1}} \right)$ (2)

Variation Coefficient, $V_{\%} = \frac{S}{\overline{X}}$ x 100 (3)

Also, the coefficients of simple linear correlation were calculated using the formula: $r_{xy} = S_{xy} / S_x \cdot S_y$ in order to identify the sense and intensity of the interrelationship between various economic indicators. [4,23]

Finally, the Classification Method by Points, a quantitative assessment method largely used in enterprise management, [1,3] was applied so that each farm was evaluated based on a total number of points, resulting from the sum of points received for each economic indicator, according to the rating scale which varied between 1, the maximum mark and 8 the minimum mark.

This methodology allowed the classification of dairy farms, according to the principles:

(a) a farm which got the lowest number of points should be classified on the top position and

(b) a farm with the highest number of points should be classified on the last position.

RESULTS AND DISCUSSIONS

The economic indicators characterising each farm included in this experiment are presented in Table 1.

Milk yield was 5,933 kg/cow/year in average for the all 8 dairy farms. It varied between 5,115 kg/cow/year for the farm F8, the minimum level, and 6,730 kg/cow/year in case of the farm F5, the maximum level. The variation coefficient was 10 % reflecting a relative low variation among farms (Table 1 and 2).

Marketed milk yield was 5,375 kg/cow/year in average, and varied between 4,501 kg/cow/year in case of F8, the minimum level, and 5,940 kg/cow/year for the farm F4. The variation coefficient accounted for 10.21 % (Table 1 and 2).

Gross product from milk was Euro 1,894/cow/year in average for the 8 farms, and varied between Euro 1,520 per cow and year in case of F8 and Euro 2,333/cow/year in case of F5. The variation coefficient was 14.26 % reflecting a relatively high difference among farms regarding this economic indicator.

Gross product was determined by milk yield and milk price. Milk price varied between Euro 0.31/kg, the maximum level and Euro 0.26/kg, the minimum level (Table 1 and 2).

Gross product from calf accounted for Euro 82.6/cow/year in avergae, ranging between Euro 86/cow/year in case of F6 and Euro 80/cow/year in case of F2 and F3. Its level was influenced by calf live weight which varied between 80 and 90 kg/head at delivery and price per kilogram live weight, which ranged between Euro 0.93 and Euro 1 per kilogram (Table 1 and 2).

Gross product from the culled cow recorded an average of Euro 145 taking into consideration all the eight farms, with a variation coefficient of 10.81 %. The level of this economic indicator ranged between Euro 158/cow/year, the lihest value, in case of F6 and Euro 118/cow/year, the lowest value, in case of F3. The value of this economic indicator depended on the cow live weight at the age of culling, which varied between 550 kg and 600 kg and price per kilogram live weight, whose average value was Euro 1.11/kg in average. Also, it depended on the culling rate, whose value varied from a farm

to another between 25 % in case of F1, F6 and F8, 20 % in case of F2, 23 % in case of F4, F5 and F7 and 18 % in case of F3 (Table 1 and 2).

Gross product from manure was in average Euro 282.2, with a variation coefficient very small, just 4.46%, reflecting differences of less importance between farms. Its level was determined by the amount of manure collected from a cow, which varied between 26.4 cubic meters/year, the highest level and 24.2 cubic meters/year, the lowest level and the manure price, whose average value was Euro 11.11/tonne. Its level varied between the maximum level Euro 297/cow/year in case of F7 and the minimum level, Euro 268/cow/year in case of the farm F1 (Table 1 and 2).

Total Gross product registered in avergae Euro 2,403.87/cow/year and a variation coefficient of 11.28 %. The maximum gross product per cow and year was registered by the farm F5. Euro 2,863 and the minimum level of this indicator was recorded by the farm F8, Euro 2,038 (Table 1 and 2).

The contribution of various products to gross product/cow/year was the following one: milk 78.79 %, the highest weight, calf 3.43 %, culled cow 6.03 % and manure 11.75 %.

Table 1.Economic indicators achieved by each farm in the year 2013

Farm	Milk yield kg/ cow/ year	Marketed milk kg/ cow/ year	Gross product -Euro/cow/year					Variable cost- Euro/cow/year					Gross margin Euro/ cow/ year
			From milk	From calf	From culled cow	From manure	Total	From replacing heifer	From feed	From own mechanical works	From veterinary service, electricity, water, AI	Total	
F1	5,840	5,673	1,780	82	152	268	2,282	141	516	18	183	858	1,424
F2	5,950	5,576	1,813	80	122	270	2,285	108	479	14	188	789	1,486
F3	6,370	5,670	2,208	80	118	288	2,694	106	480	15	195	796	1,898
F4	6,600	5,940	2,011	83	153	293	2,539	112	504	26	207	849	1,690
F5	6,730	5,922	2,333	84	150	296	2,863	127	488	17	210	942	2,116
F6	5,500	4,950	1,718	86	158	268	2,231	114	466	19	184	783	1,448
F7	5,360	4,770	1,769	82	151	297	2,299	132	490	18	181	821	1,478
F8	5,115	4,501	1,520	85	156	277	2,038	120	465	19	197	801	1,237

Source: Farms book-keeping, Own calculations.

Variable cost for the replacing heifer accounted in average for Euro 120, taking into consideration the culling rate and market price per heifer, whose value varied between Euro 488.88/heifer, the maximum level, in case of F5, and Euro 377.77/heifer, the minimum level in case of F2, F6, F7 and F8. The variation coefficient was 38.91 % reflecting a large difference among farms, between Euro 106/cow/year in case of F3 and Euro 141/cow/year in case of F1 (Table 1 and 2).

Variable cost for cow feeding was in average Euro 487.25/cow/year with a low variation coefficient, 3.71 %. It varied between Euro 465/cow/year, the minimum level in case of F8 and Euro 516/cow/year, the maximum level in case of F1.

The most of forages were produced in the farms and just a few amount was bought from the market. This contributed to savings of variable cost determined by cow feeding (Table 1 and 2).

Variable cost for own mechanical works varied between the maximum level, Euro 26/cow/year in case of F4 and the minimum level, Euro 14/cow/year in case of F2. Its average level acounted for Euro 18.25/cow/year with a variation coefficient of 19.72 %, reflecting large differences among farms because of the applied technologies and technical endowment in each farm (Table 1 and 2).

Variable cost for veterinary services, electricity, water consumption and artificial insemination registered in average Euro 193.75/cow/year and a variation coefficient of 6.30 %. This variable cost item varied between Euro 215, the maximum level in case

of the farm F5, the farm with the highest milk yield and the minimum level, Euro 181/cow/year in case of F7, where milk yield was 5,360 kg/cow/year, one of the lowest production after F8, which recorded 5,115 kg/cow/year.

This cost item was deeply influenced by the reproduction problems of milking cows, treatments and medicines cost, energy consumption and its price per kwh, water consumption and its tarrif per cubic meter, price by frozen semen dose from high breeding value bulls and tarrif per AI service (Table 1 and 2).

Table 2. Averages, standard deviation and the variation coefficients for the economic indicators

Indicator	MU	$\bar{X}$	S	V%
Milk yield	Kg/cow/year	5,933	593.40	10.00
Marketed milk yield	Kg/cow/year	5,375	548.89	10.21
Gross product from milk	Euro/cow/year	1,894	270.19	14.26
Gross product from sold calf	Euro/cow/year	145	15.68	10.81
Gross product from culled cow	Euro/cow/year	82.6	2.20	2.66
Gross product from manure	Euro/cow/year	282.2	12.60	4.46
Gross Product-Total	Euro/cow/year	2,403.87	271.25	11.28
Cost of replacing heifer	Euro/cow/year	120.00	46.71	38.91
Cost of feeding	Euro/cow/year	487.25	18.11	3.71
Cost of own mechanical works	Euro/cow/year	18.25	3.60	19.72
Cost of veterinary services, electricity, water, artificial insemination	Euro/cow/year	193.75	12.22	6.30
Variable cost-Total	Euro/cow/year	819.25	31.43	3.83
Gross Margin	Euro/cow/year	1,584	259.49	16.37

Source: Own calculations

Total variable cost/cow/year, as a sum of all the item costs mentioned above, accounted for Euro 819.25 for all the 8 farms used in this experiment, with a variation coefficient of 3.83 %. The highest value for this indicator was Euro 858 in case of F1 and Euro 783 in case of F6 (Table 1 and 2).

The contribution of various variable cos items to total variable cost per cow and year was the following one: feeding cost 60 %, replacing heifer 14.64 %, veterinary services, energy and water consumption, and artificial insemination service 23.14 %, and own mechanical works 2.22 %.

Standard gross margin, calculated as a difference between gross product/cow/year and variable cost/cow/year, registered in avergae Euro 1,584.62 /cow/year with a variation coefficient of 16.37 %, reflecting differences from a farm to another. Its highest level was Euro 2,006/cow/year in case of the farm F5, the farm with the highest milk yield (6,730 kg/cow/year), and Euro 1,237/cow/year, the lowest level in case of F8, the farm with the lowest milk production average (5,115 kg/cow/year) as shown in Table 1 and 2.

The average values, standard deviation and variation coefficients for each economic indicator taken into considerationin this research work are presented in Table 2.

Coefficients of simple linear correlation are presented in Table 3.

A strong and positive correlation was found between milk yield and marketed yield, also with gross product from milk, and total gross product per cow/year and standard gross

margin as well.
Another substantial and positive correlation was noticed between gross product from calf and total gross porduct per cow and year and standard gross margin.
A positive correlation was also found between gross product from culled cow and total gross product per cow and year and standard gross margin.
Another positive relationship was noticed between gross product from manure and gross product/cow/year and standard gross margin.
A positive correlation was found between the total variable cost and various variable cost items: heifer cost, feeding cost, own mechanical works cost, veterinary services, energy, water and AI cost as well.

Table 3. Coefficients of simple linear correlation between the economic indicators

	Milk yield	Marketed milk yield	Gross product from milk	Gross product from calf	Gross product from culled cow	Gross product from manure	Variable cost-Total	Standard Gross Margin
Milk yield	-	0.916***	0.923***	-	-	-	-0.637	0.636
Marketed milk yield	0.916***	-	0.920***	-	-	-	-0.503	0.622
Gross product from milk	0.812**	0.789**	-	-	-	-	-	0.724**
Gross product from sold calf	0.806**	-	-	-	-	-	-	0.682
Gross product from culled cow	0.890***	-	-	-	-	-	-	0.740**
Gross product from manure	0.826**	-	-	-	-	-	-	0.815**
Gross Product-Total	0.902***	0.905***	0.887**	0.806**	0.842**	0.825**	-0.551	0.910***
Cost of replacing heifer	-0.393	-	-	-	-0.465	-	0.825**	-0.527
Cost of feeding	-0.448	-	-	-	-	-	0.988***	-0.682
Cost of own mechanical works	-0.316	-	-	-	-	-	0.352	-0.435
Cost of veterinary services, electricity, water, artificial insemination	-0.551	-	-	-	-	-	0.313	-0.529
Variable cost-Total	-0.503	-0.500	-0.478	-0.242	-0.466	-0.269	-	-0.624
Gross Margin	0.636	0.622	0.762**	0.726**	0.726**	0.789**	0.745**	-0.546

Source: Own calculations

A negative correlation was noticed between milk yield and variable cost (r = - 0.503 and various variable cost items: heifer cost, feeding cost, own mechanical works cost, veterinary services, energy, water and AI cost as well.
Another negative correlation was found between standard gross margin and variable cost (r = - 0.624) and all the variable cost items as well (Table 3).
Farm classification based on the total number of points received for all the economic indicators taken into consideration in this study is presented in Table 4.
The 1st position was occupied by the farm F5, which recorded 45 points, because this farm came on the 1st position for milk yield, marketed milk yield, gross product from milk, total gross product per cow and year and gross margin/cow/year and on the 7th position for variable costs.
Also, the 1st position was occupied by the fram F3, which recorded the same number of points, 45, but it came on the 3rd position for milk yield and variable cost, on the 2nd position for gross product from milk, total gross product per cow and year and on the 2nd position for standard gross margin, on the 1st position for heifer cost and own mechanical works as well.
On the 2nd position was situated the farm F4, which got 52 points**,** as it came on the 2nd position for milk yield and marketed yield, on the 3rd position for gross product from milk, gross product from culled cow, gross product from manure and total gross product per cow and year, and also it came on the 6th position for variable cost and on the 3rd position for standard gross margin.
Also on the 2nd position was placed the farm F2, with the same number of points, 52, like the farm F4, but it was placed on the 4th position for milk yield, for gross product from milk and for standard gross margin, on the 5th position for marketed milk and for total gross product per cow and year, on the 1st position for own mechanical works cost, on the 3rd

position for feeding cost, and on the 2nd position for total variable cost.

On the 3rd position came the farm F6, with 55 points, which was situated on the 6th position for milk yield and marketed milk, on the 1st position for gross product from sold calf, gross product from the culled cow sold in the market and variable cost as well, on the 3rd position for the cost including veterinary services, energy, water, and artificial insemination, and on the 5th position for standard gross margin per cow and year.

On the 4th position came the farm F7, with 62 points. It occupied the 5th position for standard gross margin, but the 1st position for gross product from manure and variable cost including veterinary services, energy, water and artificial insemination.

On the 5th position came the farm F8, as it got 71 points. It was placed on the 8th position for milk yield, marketed milk, gross product from milk and total gross product, and standard gross margin as well, but on the 1st position for feeding cost and the 4th position for total variable cost.

Table 4. Farm classification based on Point Method (Rating Method)

Indicator	Dairy farms							
	F1	F2	F3	F4	F5	F6	F7	F8
Milk yield	5	4	3	2	1	6	7	8
Marketed milk yield	3	5	4	2	1	6	7	8
Gross product from milk	5	4	2	3	1	7	6	8
Gross product from sold calf	4	5	5	4	3	1	4	2
Gross product from culled cow	4	7	8	3	6	1	5	2
Gross product from manure	8	6	4	3	2	7	1	5
Gross Product-Total	6	5	2	3	1	7	4	8
Cost of replacing heifer	8	2	1	3	6	3	7	5
Cost of feeding	8	3	4	7	5	2	6	1
Cost of own mechanical works	4	1	2	6	3	5	4	5
Cost of veterinary services, electricity, water, artificial insemination	2	4	5	7	8	3	1	6
Variable cost-Total	8	2	3	6	7	1	5	4
Gross Margin	7	4	2	3	1	6	5	8
Total points	72	52	45	52	45	55	62	71
Position	6	2	1	2	1	3	4	5

Source: Own calculations

On the 6th position came the farm F1, with 72 points. It occupied the 7th position for standard gross margin and the 8th position for total variable cost, heifer cost, feeding cost and the 5th position for milk yield and the 6th position for total gross product.

Therefore, the best farms were F5 and F3, whichwere placed on the 1st position for milk yield, 6,730 kg/cow/year (the highest production level) and, respectively 6,370 kg/cow/year (the 3rd position), and also the 1st position for total gross product and the highest standard gross margin (the 1st position) and, respectively on the 2nd position, reflecting the direct connection between milk production and standard gross margin, and also between milk yield, total gross product and standard gross margin.

CONCLUSIONS

The major economic indicators with a deep impact on the financial results, in terms of gross margin are milk production and marketed milk yield. For this reason, they should be placed on the top hierarchy of the factors linked to farms size. The optimization of gross margin or profit is a function of the harmonization between the technical optimum and economic optimum in terms of production cost and milk price.

On the third position it should be positioned milk production cost, which could assure similar positions when standard gross margin/cow and year are taken into consideration.

Feeding cost, replacing heifer cost, the cost of

veterinary services, energy, water and artificial insemination are closely correlated with total variable cost.

In this study it was not taken into account the number of dairy cows, because it was considered without importance in relation to financial results and farm size. The calculations made per cow and year are enough in order to identify the main criteria which should be considered in farm classification according to economic efficiency.

The application of the point method placed twofarms on the top position: F5 and F3, each one getting 45 points for the criteria takeninto account. However, the farm F5 came on the 1st position for milk yield, marketed milk yield, gross product from milk, total gross product per cow and year and gross margin/cow/year and on the 7th position for variable costs, while the farms F3 came on the 3rd position for milk yield and variable cost, on the 2nd position for gross product from milk, total gross product per cow and year, and standard gross margin, and on the 1st position for heifer cost and own mechanical works as well.

Gross margin is a barometer of economic efficiency in dairy farming, but it is determined by milk yield, which should be considered the major factor of profitability. The highest milk production per cow and year, the higher profitability in dairy farming.

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REFERENCES

[1]Armstrong, M, 2002, A Handbook of Management Techniques, 3rd Ed.,Kogan Page Business Books
[2]Avila, M., Technical Paper 5: Concepts and Methods for Economic Evaluation of Alley Farming
[3]Brilman, J., Maire, C., 1990, Manuel d'evaluation des entreprises. Paris,Les Editions d'organisation
[4]Ceapoiu, N, 1968, Statistical methods applied in agricultural and biological experiments, AgroSilvica Press House, Bucharest
[5]Chagunda, M. G., Wollny, C., Ngwerume, F., Kamwanja, L. A., Makhambera, T. P. E., Environmental factors affecting milk production of a Holstein Friesian herd in Southern Malawi, http://www.ilri.org/InfoServ/Webpub
[6]Draghici, M., Oancea Margareta, Plesoianu, G., Zahiu Letitia, Screiciu Florin, 2004, Text Book of Farm Management, Atlas Press, p.36
[7]EU Commission, Regulation 1242/2008 establishing the Community typology of agricultural holdings
[8]EU, Glossary: Standard output (SO), http://epp.eurostat.ec.europa.eu/ statistics_explained/ index.php/ Glossary: Standard_output
[9]EU Commision Regulation (EC) 867/2009 amending and correcting Regulation 1242/2008 establishing the Community typology of agricultural holdings
[10]Food safety starts at farm, The Friesian and AgroConsultancy, The Bilateral Romanian Dutch Project, Quality Control along milk chain in Romania,
[11]Iosif, G., Stroe Maria, 1987, Optimum dimension of agricultural units-animal farms and holdings, Ceres Press House, Bucharest, p.21-23
[12]Javed, K., Afzal, M., Sattar, A., Mirza, R. H., 2004, Environmental factors affecting milk yield in Friesian cows in Punjab, Pakistan, Pakistan Vet. J., 24(2): 58-62
[13]MacDonald James M., O'Donoghue Erik J., McBride William D., Nehring Richard F., Sandretto Carmen L., Mosheim Roberto, Profits, Costs, and the Changing Structure of Dairy Farming, USDA, Economic Research Report Number 47
[14]Munteanu Liviu, Factor sinfluencing production, http://www.ojcacs.ro
[15]Oancea Margareta, 2007, Management, Economic and strategy of agricultural units, Ceres Press House
[16]Obadina, A.O., Factors Affecting Milk Yield, Dairy Production 342-450, A Milk Yield & Composition, p.1-9, http://unaab.edu.ng/attachments/Obadina.pdf
[17]Pirvutoiu, I., Popescu Agatha, 2012, Research concerning Standard Gross Margin depending on Yield in Dairy Farming, Scientific Papers Animal Science and Biotechnologies, Vol.45(2):339-342
[18]Popescu Agatha, 2009, A comparative study concerning economic efficiency for various levels of milk yield, Scientific Papers Animal Science, Iasi, Vol.52, p.525-530
[19]Popescu Agatha, 2010, Research concerning the Use of Regression Function in Gross Margin Forecast, Bulletin of UASVM Cluj-Napoca, Romania, Horticulture-Management, Vol.67(2):197-202
[20]Salfer Jim, 2010, Know the drivers of dairy farm profitability, Dairy Star September 3, 2010
[21]Sarkerer Debnarayan, Ghosh Bikash Kumar, 2008, Economics of Milk Production in West Bengal: Evidence from Cooperative and noncooperative Farms, Journal of Economics and Business, Vol. XI – 2008, No 1 & No 2
[22]Schulte Kristen, Dhuyvetter Kevin, 2010, Factors

Impacting Dairy Profitability:, An Analysis of Kansas Farm Management Association Dairy Enterprise Data , Department of Agricultural Economics, Kansas State University January 2010

[23]Trebici, V., Iosifescu, M., Moineagu, C., Ursianu Emiliana, 1985, Small Statistical Encyclopedia, Scientific and Encyclopedic Publishing House, Bucharest