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REGIONAL DIFFERENCES IN THE COST AND INCOME SITUATION OF DAIRY FARMING

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1. PRELIMINARIES AND OBJECTIVES OF THE RESEARCH

There have been numerous studies conducted regarding the cost and profitability analysis of dairy farming. These are introduced in the literature review in depth.

In the dissertation I wished to approach this theme from fundamentally new aspect. My starting point is that the spatial development units of the regional policy of the European Union are the so called statistical regions defined according to the single classification system of the EU (NUTS). Their great importance is also proven by that the supports financed by the structural funds of the EU are available through this system. The previously mentioned was the reason to choose the seven statistical regions of Hungary as the basis of the comparisons of the costs and profitability of dairy farming.

The analysis covered the expenses and outputs of various dairy farms of the seven regions both in natural and financial values in the periods between 2001 and 2006 and between 2004 and 2006.

The regional analysis covers:

- The yields,
- The production value,
- The market receipts and within it the milk receipts,
- The factors influencing the production costs, structure of the costs (by type of costs, and fix and variable costs, labour and related expenses), the costs of used feed, thus e.g. the coverage of the own produced and the purchased feed,
- The definition and then the analysis of indicators concerning costs management, the analysis of the cost level,

- To calculate the income and profitability, the definition and analysis of necessary indicators (for instance dairy income, index of net farm income per production cost),
- Assessment of the complex indicators of economic efficiency – specific milk yield per cow, dairy income per cow, cost level and profitability index.

Based on the detailed analysis of economic indicators the regional comparison of various dairy farms (private farms, economic organisations and market decisive companies). On the basis of the data of years from 2001 to 2006 the setting up of the rank order of regions regarding the economic efficiency indicators. The setting up of the rank order of the regions according to the data of all the three types of dairy farms in the years from 2004 to 2006.

The adaptation of a specific analysing method, which enables economic analysis of specific areas and spaces.

2. MATERIAL AND METHOD

In accordance with the research objectives, the cost and profitability analysis of the Hungarian dairy farming was conducted on regional basis. In this work, considering the EU regional policy, I chose the so-called statistical regions as spatial development units to be the basis of the analyses, which are defined by the single classification system of the EU NUTS (Nomenclature des Unites Territoriales Statistiques). Their great importance is also proven by that the supports financed by the structural funds of the EU are available through this system. The Hungarian regions of spatial development are NUTS II level regions (NUTS I is the three great regions, NUTS III is the counties and Budapest).

In Hungary, the statistical regional partitioning being in force was first based on the point 5.2 of the Parliament decision No. 35/1998/III.20 on the national spatial development concept in 1998. The seven statistical regions of Hungary are the NUTS II regions at the same time, in the five-graded regional classification of the European Union.

The seven regions and their area:

- Western Transdanubia: Győr-Moson-Sopron, Vas, Zala counties
- Central Transdanubia: Fejér, Komárom-Esztergom, Veszprém counties
- Southern Transdanubia: Baranya, Somogy, Tolna counties
- Central Hungary: Budapest and Pest counties
- Northern Hungary: Borsod-Abaúj-Zemplén, Heves, Nógrád counties
- North Great Plain: Hajdú-Bihar, Jász-Nagykun-Szolnok, Szabolcs-Szatmár-Bereg counties
- South Great Plain: Bács-Kiskun, Békés, Csongrád counties

Right after the enactment of the above mentioned regulation, the Hungarian Central Statistical Office published a series on the Hungarian regions in 1998, whose seven volumes introduce the statistical regions in details, while the eighth volume summarises the most relevant data and figures of the regions. These publications provided information for regional development boards, programmers and polity institutions for spatial development; thus they did not include sectorially detailed data or information on the various types of companies which is indispensable for detailed farm economic analyses.

The cost and profitability analysis of the animal production or within it that of dairy farming and the collection and processing of various data necessarily for this have a several decade past in Hungary. It especially accelerated in the period around and prior to the EU accession in the preparation phase, which definitely put the demand for economic transparency in front, even at sectoral level.

In Hungary, in accordance with the preparations for the EU accession, the establishment of the Hungarian Agricultural Accountancy Data Network started in 1996, which was modelled according to the German example (FADN). The gradually developing network reached a full coverage in 2001; therefore the starting year of the analyses of the dissertation is year 2001.

Three main aspects were considered in the classification of the farms: size, legal form and geographical situation of the farms.

In terms of size, the farms were selected in accordance with the European Size Unit (ESU), expressing the economic size of the farms. Considering the farm and production size typical for Hungary, those farms were selected to the farm data network that exceed 2 ESU, which represented more than 90 thousand agricultural companies giving almost 85 per cent of the national production value in 2006 (*Béládi-Kertész, 2007*).

In terms of legal form, the farm data network distinguishes two groups, which was also applied in the methods of the dissertation. One of them is the

private farms, the other one is the economic organisations. The former includes primary producers, private entrepreneurs and contracted farms of the previous two, managed as a separated company. The rest of the legal forms were included in the group of economic organisations.

Besides the previously described legal classification, the definition of so-called market decisive farms was introduced from 2004, which reflects to the potentially viable and competitive production enabled by the resources of the farm (e.g. machinery and equipments, livestock size, human resources).

The data of economic organisations (companies) were analysed for years from 2001 to 2006, while those of market decisive farms only between 2004 and 2006, because these later ones were available only after 2004.

In terms of geographical situation, the analysis of the costs and profitability of the farms was based on seven statistical regions. **Table 1** shows the data referring to the farm size typical for the involved farm classes and regions.

Table 1

Size of dairy farm by types of farms
Years 2004-2006, number of cow per farm

<i>Region</i>	<i>Private farm</i>			<i>Companies</i>			<i>Market decisive farms</i>		
	<i>2004.</i>	<i>2005.</i>	<i>2006.</i>	<i>2004.</i>	<i>2005.</i>	<i>2006.</i>	<i>2004.</i>	<i>2005.</i>	<i>2006.</i>
Western Transdanubia	13	12	15	222	265	309	236	297	228
Central Transdanubia	6	25	14	374	504	419	374	386	392
Southern Transdanubia	21	23	20	535	818	509	455	632	460
Central Hungary	8	5	8	232	218	330	351	278	291
Northern Hungary	5	6	6	246	302	336	193	211	391
North Great Plain	9	8	16	204	213	275	267	244	252
South Great Plain	5	8	8	191	310	660	86	632	654
Average	8	8	11	266	345	390	282	350	337

Source: own construction based on AKI 2007

The primary data of the Farm Accountancy Data Network of the Agricultural Research Institute were organised regionally in order to form indicators that are suitable for detailed sectoral analyses and are basically used generally in farm economic analyses. The average number of cows during the period was considered as most general unit for expressing specific figures, which as reproduction basic unit is the biological basis of milk production. In forming the indicators, an emphasised attention was paid to natural performances (specific milk yield, reproduction parameters) as well as to the financial assessment of the expenses and outputs of dairy farming. In the analysis of these indicators, a comparable method was followed, which

considered both the years of the period and the types of the farms involved in the analysis.

In the financial definition of the output value two main indicators were separately analysed. One of them is the production value, which is the quantity of the major and secondary products of the farm multiplied by the realisable price per product, which is increased by the amount of direct supports and other returns of the sector. The second one is the total market receipts of the farm, which means the net receipts for sold the major and secondary products and the modifying items, quantity and quality premiums.

Concluding from the peculiarities of dairy farming, the production costs were a highlighted issue of the analyses, and within it the costs and expenses of own produced and purchased feed and the influencing factors. These costs were analysed in their structure and according to their relation with the volume of the production, and were compared to the production value as well. Another highlighted issue of the analyses was the role of the factors influencing the specific production cost. The reason for the concern to the specific production cost was that I consider it as the basic indicator of economic efficiency. Namely, this indicates the quantity of the live and dead labour used in the production; thus the productivity of the inputs can be assessed.

A complex system of indicators was used to analyse the sectoral income and profitability, where the net farm income was reflected to various bases and was compared to various financial factors (e.g. production cost). Net farm income is an important synthetic indicator of dairy farming, because it indicates the difference between production value and production cost, and all of the returns and expenses influencing the profitability of the production. Net farm income calculated thus always as the difference of the production value and the production costs represents profit (positive) or loss (if it is negative). The analysis of the net farm income per various parameters (average cow,

production cost, etc.) provides opportunity for the analysis of different profitability indicators, which were applied in the dissertation.

In accordance with the objectives of the research, a complex analysis of four indicators was carried out for measuring the economic efficiency of dairy farming and a rank of order of the regions was set up for each type of farm. The indicators applied in the efficiency analysis were:

- specific milk yield, litre per cow
- net farm income per average cow, HUF per cow
- cost level, %
- index of net farm income and cost level, %

With the application of these indicators, the seven regions of Hungary was ranked from first (best) to seventh (worst) for the years 2001 to 2006 from the aspect of companies and for 2004 to 2006 from the aspect of private and market decisive farms. The average of the rank numbers were calculated and cumulated considering the six and three year periods of the analyses; the cumulated figure thus finally comes from the averages of the efficiency indicators.

3. RESULTS

3.1. Analysis of income and profitability

In farm economic analyses, the income of the production is expressed by the net farm income which is the difference between the dairy production value and the total production cost. This indicator is considered as a synthetic indicator of dairy farming, which involves the financial values of both the dairy performance and the undertaken economic costs. The net farm income calculated in such a way is the most suitable indicator to be expressed per unit of the production that is the average cow of the period. Of course, similar calculations can apply other bases as well, such as cattle unit or livestock unit. In my opinion, the net farm income per average cow is a reliable indicator to show the performance of the dairy farming. Besides this indicator, the net farm income was compared to the farm total receipts and the total costs as well. The net farm income per average cow of companies is shown in Table 2 for the years 2001 to 2006; while that of private farms and market decisive companies is shown in Table 3 for the years 2004 to 2006.

Table 2

**Net farm income per cow in companies in years 2001 to 2006,
HUF per average cow**

<i>Region</i>	<i>2001.</i>	<i>2002.</i>	<i>2003.</i>	<i>2004.</i>	<i>2005.</i>	<i>2006.</i>
Western Transdanubia	53 752	73 708	50 968	50 463	80 050	110 424
Central Transdanubia	107 118	135 223	67 979	54 405	149 496	148 764
Southern Transdanubia	61 539	164 215	80 256	46 400	39 960	78 933
Central Hungary	130 117	36 776	72 420	2 067	188 519	230 041
Northern Hungary	60 595	110 310	50 728	1 164	45 805	230 322
North Great Plain	146 652	99 947	57 326	56 701	186 168	243 999
South Great Plain	62 200	126 959	67 159	71 332	82 655	82 714
Average	103 916	112 997	66 254	43 609	93 486	143 123

Source: own calculations based on AKI 2007

Table 3

**Net farm income per cow in private farms and market decisive companies
in years 2004 to 2006, HUF per average cow**

<i>Region</i>	<i>2004.</i>		<i>2005.</i>		<i>2006.</i>	
	<i>Private</i>	<i>Market decisive</i>	<i>Private</i>	<i>Market decisive</i>	<i>Private</i>	<i>Market decisive</i>
Western Transdanubia	123 915	54 242	133 671	79 293	79 452	109 387
Central Transdanubia	132 755	54 405	137 910	164 148	218 589	126 677
Southern Transdanubia	74 207	46 210	95 346	41 415	151 955	78 960
Central Hungary	71 109	18 711	190 693	196 764	233 281	226 724
Northern Hungary	83 743	1 797	38 273	42 907	117 328	226 442
North Great Plain	96 065	62 242	107 640	135 392	129 088	222 442
South Great Plain	78 107	33 349	33 783	101 643	90 889	108 516
Average	91 505	42 399	110 561	88 932	135 283	141 727

Source: Own calculation based on AKI 2007

The specific indicator of net farm income of the companies varies from 1164 HUF to 243000 HUF in the analysed region. The analysis of the mean

values shows that the lowest figure (year 2004) was determined greatly by the figures of two regions (Central and Northern Hungary) which are close to the minimum value. This statement is proven by the indicator of cost level, because it was the highest in 2004 with 91 per cent, and Central and Northern Hungary have same figures as the maximum value, with 99.6% and 99.7%, respectively. Interesting conclusions can be drawn from the analysis of the net farm income, the specific milk yield, and the cost level. The specific milk yield was the highest in year 2004 (6552 l), which was similar to these areas (6553 l and 6048 l, respectively), the net farm income was however determined by the production costs not by the milk yield. The analysis covered the figures of farm receipts and the milk price as well. The farm receipts were not the lowest in this year, and it was rather special in the two regions (in Central Hungary it was 470493 HUF above the average, while in Northern Hungary 370745 HUF below the average). Although the milk price is the lowest in this year, it is hardly lower than in year 2006 for example, where the net farm income per cow is more than the triple of that in 2004. Besides the above mentioned, it is certainly important that the figure of net farm income per cow is higher than the average in Central Transdanubia in all years of the period analysed, which was expected in accordance with the cost level.

According to the analysis of the different types of farms, the figure of net farm income per cow is the highest in two years in case of private farms, only in year 2006 it was exceeded by the figures of the companies and the market decisive farms. In this type of farms, the farm size is much lower (8-8-11 cows) (see **Table 1**) than in the other two types of the farms. It is also worth attention that market decisive farms experienced an extreme variability of the net farm income per cow; it varies from -18711 HUF to 226724 HUF, and just right in Central Hungary, but the range of the figures is similarly high in case of Northern Hungary with figures varying between 1797 HUF and 226442 HUF.

Beside the analysis of the net farm income, farm economic analyses often apply indices of the income and other indicators; thus, the index of income and farm receipts or the total production costs. The profitability is thus compared to the farm receipts or to the production costs. **Table 4** shows the indices of income and farm receipts in the companies, while **Table 5** shows them in private and market decisive farms.

Table 4

**Indices of net farm income and farm receipts in companies
in years 2001 to 2006, %**

<i>Region</i>	<i>2001.</i>	<i>2002.</i>	<i>2003.</i>	<i>2004.</i>	<i>2005.</i>	<i>2006.</i>
Western Transdanubia	11.7	14.8	12.5	11.7	17.5	23.4
Central Transdanubia	21.6	27.5	13.9	12.3	30.1	33.5
Southern Transdanubia	14.1	34.1	15.4	9.6	8.8	16.9
Central Hungary	26.9	8.4	14.5	0.4	37.3	47.4
Northern Hungary	11.4	30.5	11.1	0.3	11.8	45.2
North Great Plain	37.5	21.1	11.1	13.1	35.9	45.6
South Great Plain	14.9	25.9	13.7	14.8	15.3	16.4
Average	23.6	24.1	13.4	9.7	19.4	29.8

Source: Own calculation based on AKI 2007

Table 5

**Indices of net farm income and farm receipts in private and market
decisive farms, in years 2004 to 2006, %**

<i>Region</i>	<i>2004.</i>		<i>2005.</i>		<i>2006.</i>	
	<i>Private</i>	<i>Market decisive</i>	<i>Private</i>	<i>Market decisive</i>	<i>Private</i>	<i>Market decisive</i>
Western Transdanubia	39.2	12.7	40.8	17.4	29.6	24.9
Central Transdanubia	36.3	12.3	31.8	36.9	63.4	30.3
Southern Transdanubia	23.6	9.6	29.8	9.2	40.7	17
Central Hungary	23.5	-4.2	53.1	38.6	87.2	47.1
Northern Hungary	25.7	0.5	3.8	11.5	32.9	45.4
North Great Plain	30.1	14.7	30.2	28.3	36.8	43.3
South Great Plain	32.6	9.1	13	19	34.1	21.5
Average	29.7	9.7	27.9	19.1	44.7	30.2

Source: Own calculation based on AKI 2007

In companies, the index of the net farm income and farm receipts varies from 0.3 and 47 per cent in the years 2001 to 2006, with the lowest figure in year 2004. The fluctuation of the figures follows the tendencies of the milk price changes, the farm receipts and the figures of net farm income per cow. The index of the net farm income and farm receipts is above the average in Central Transdanubia in all of the years analysed, with only the exception of year 2001. It can be also regarded as balanced in Western Transdanubia.

The index of the net farm income and farm receipts of private farms increases with a slight slip back in year 2005, reaching the highest figure by the end of the period analysed, which even exceeds the figure of the companies. The index varies from 3.8% to 87.2%, while the variation is even higher in case of the market decisive farms, ranging between -4.2% and 47.1%. Both the minimum and the maximum values are experienced in Central and Northern Hungary. In this category of the farms, the index of the net farm income and farm receipts increases year by year between 2004 and 2006, reaching the

maximum value of the period with 30.2 per cent, which is even the highest than the figures of the companies in the period from 2001 to 2006.

The index of net farm income and production cost is considered as the most generally used profitability indicator in accordance with the most widely spread indicator in farm economics. To follow the method of the previous analysis, the indices of net farm income and production cost were calculated in case of companies, private and market decisive farms. The results are presented in **Table 6** and **Table 7**.

Table 6

**Indices of net farm income and production costs in companies
in years 2001 to 2006, %**

<i>Region</i>	<i>2001.</i>	<i>2002.</i>	<i>2003.</i>	<i>2004.</i>	<i>2005.</i>	<i>2006.</i>
Western Transdanubia	14.4	17.6	13.4	12.2	18.1	25.4
Central Transdanubia	24	25.9	14.3	12.4	38.3	40.6
Southern Transdanubia	15.2	1.1	16.1	9.3	8.2	15.9
Central Hungary	32.3	8.5	15.9	0.4	49.5	74.7
Northern Hungary	18.1	27	11.5	0.3	10.9	62.5
North Great Plain	33.7	22.1	12.5	14.5	49.1	63
South Great Plain	14.3	29.1	14.4	16.2	15.3	16.1
Average	25.2	24.9	14.3	9.7	20.4	33.7

Source: Own calculation based on AKI 2007

Table 7

**Indices of net farm income and production costs in private and market
decisive farms, in years 2004 to 2006, %**

<i>Region</i>	<i>2004.</i>		<i>2005.</i>		<i>2006.</i>	
	<i>Private</i>	<i>Market decisive</i>	<i>Private</i>	<i>Market decisive</i>	<i>Private</i>	<i>Market decisive</i>
Western Transdanubia	50.9	13.3	48.9	17.9	32.3	26.4
Central Transdanubia	43.4	12.4	37.6	48.3	96.8	35.6
Southern Transdanubia	26.4	9.3	35.3	8.6	54.2	16
Central Hungary	24	-3.6	70.2	52.4	81.4	73.6
Northern Hungary	34.5	0.4	14.7	10.7	41.6	62.8
North Great Plain	37.9	16.5	38.6	35.6	47.5	58.3
South Great Plain	36.1	9.1	12.1	19.4	38.6	22.6
Average	35.9	9.7	40.2	19.9	54.2	34.5

Source: Own calculation based on AKI 2007

The indices of net farm income and production cost indicate special tendency in companies, in the period from 2001 to 2006. The tendency of the regional mean is similar to that of the cost level, it decreases year by year from 2001, reaching its minimum in 2004, and then after a solid growth it reaches its maximum in 2006. The figure ranges between 0.3% and 74.7%.

It is worth paying attention to that the index of net farm income and production cost is the highest in case of private farms, it increases continuously and follows the tendency of the cost level. The figure ranges between 12.1% and 96.8%. In case of market decisive farms, the figure also varies greatly, with a minimum value of -3.6% and maximum value of 73.6%.

3.2. Assessment of economic efficiency

Based on the indicators formed in the previous analyses, I have tried creating an objective solution for the assessment of the economic efficiency, as

quasi the synthesis of my analyses. In order to achieve this, the following four indicators were involved in further analysis:

- specific milk yield, litre per cow
- net farm income per average cow, HUF per cow
- cost level, %
- index of net farm income and cost level, %

By using the previously listed indicators, the rank order of the regions were set up considering the years 2001 to 2006 (6 years) for companies, while considering years 2004 to 2006 (3 years) for the private and market decisive farms.

Rank order of companies:

By specific milk yield:

1.	South Great Plain	3.2
2.	Central Transdanubia	3.3
3–4.	Northern Hungary	3.5
	North Great Plain	3.5
5–6.	Southern Transdanubia	4.3
	Central Hungary	4.3
7.	Western Transdanubia	5.5

By the figure of net farm income per cow:

1.	North Great Plain	2.7
2.	Central Transdanubia	3.0
3.	Central Hungary	3.5
4–5.	Southern Transdanubia	4.0
	South Great Plain	4.0
6.	Northern Hungary	5.3
7.	Western Transdanubia	5.5

By cost level:

1.	North Great Plain	2.8
2.	Central Hungary	3.2
3.	Central Transdanubia	3.5
4.	South Great Plain	4.0
5.	Southern Transdanubia	4.3
6.	Northern Hungary	4.8
7.	Western Transdanubia	5.3

By the index of net farm income and production cost:

1.	North Great Plain	3.0
2.	Central Hungary	3.3
3.	Central Transdanubia	3.5
4.	South Great Plain	4.0
5.	Southern Transdanubia	4.3
6.	Northern Hungary	4.8
7.	Western Transdanubia	5.0

By the cumulative figure of the four indicators:

1.	North Great Plain	3.0
2.	Central Transdanubia	3.3
3.	Central Hungary	3.6
4.	South Great Plain	3.8
5.	Southern Transdanubia	4.2
6.	Northern Hungary	4.6
7.	Western Transdanubia	5.3

Rank order of private farms, years 2004- 2006:

By specific milk yield:

1-2.	Central Transdanubia	2.3
	Central Hungary	2.3
3.	North Great Plain	2.6
4.	Southern Transdanubia	3.3
5.	Northern Hungary	5.3
6.	South Great Plain	5.7
7.	Western Transdanubia	6.3

By the figure of net farm income per cow:

1.	Central Transdanubia	1.7
2.	Central Hungary	3.0
3.	North Great Plain	3.7
4.	Western Transdanubia	4.0
5.	Southern Transdanubia	4.6
6.	Northern Hungary	5.0
7.	South Great Plain	6.0

By cost level:

1.	Central Transdanubia	2.3
2-3-4.	Western Transdanubia	3.3
	Central Hungary	3.3
	North Great Plain	3.3
5.	Southern Transdanubia	4.7
6.	Northern Hungary	5.3
7.	South Great Plain	5.6

By the index of net farm income and production cost:

1.	Central Transdanubia	2.3
2.	Western Transdanubia	3.3
3.	Central Hungary	3.7
4.	North Great Plain	4.0
5.	Northern Hungary	4.3
6.	Southern Transdanubia	4.7
7.	South Great Plain	5.3

By the cumulative figure of the four indicators:

1.	Central Transdanubia	2.1
2.	Central Hungary	3.1
3.	North Great Plain	3.4
4.	Western Transdanubia	4.2
5.	Southern Transdanubia	4.3
6.	Northern Hungary	4.9
7.	South Great Plain	5.7

It is worth attention that according to all of the four efficiency indicators, Central Transdanubia took the first place in terms of private farms, thus forming the cumulative indicator in a similar way as well.

Rank order of market decisive farms (years 2004 to 2006)

By specific milk yield:

1.	Southern Transdanubia	2.3
2.	Central Hungary	3.7
3.	South Great Plain	4.0
4–5–6.	Western Transdanubia	4.3
	Northern Hungary	4.3
	North Great Plain	4.3
7.	Central Transdanubia	5.0

By the figure of net farm income per cow:

1.	Central Transdanubia	2.6
2.	Central Hungary	3.0
3.	North Great Plain	3.3
4.	Western Transdanubia	4.3
5.	Northern Hungary	4.7
6.	South Great Plain	5.0
7.	Southern Transdanubia	6.0

By cost level:

1.	North Great Plain	2.3
2–3.	Central Transdanubia	3.0
	Central Hungary	3.0
4.	Western Transdanubia	4.0
5.	Northern Hungary	4.6
6.	South Great Plain	5.0
7.	Southern Transdanubia	6.0

By the index of net farm income and production cost:

1.	North Great Plain	2.0
2–3.	Central Transdanubia	3.0
	Central Hungary	3.0
4.	Western Transdanubia	4.0
5.	Northern Hungary	4.3
6.	South Great Plain	5.0
7.	Southern Transdanubia	6.0

By the cumulative figure of the four indicators:

1.	North Great Plain	3.0
2.	Central Hungary	3.2
3.	Central Transdanubia	3.4
4.	Western Transdanubia	4.2
5.	Northern Hungary	4.5
6.	South Great Plain	4.8
7.	Southern Transdanubia	5.1

In terms of the cumulative indicator of market decisive farms, the first three places of the rank are taken by the same regions as in case of the companies. Northern Hungary is the sixth in both cases, and the last ones are the Northern and Southern Transdanubian regions.

4. CONCLUSIONS

The analysis of the cost and income situation of the private dairy farms, companies and market decisive farms of the seven Hungarian statistical regions completed the generally applied input-output investigations of farm economic analysis with an evaluation of the economic efficiency based on complex indicators. Such indicators suitable for measuring the economic efficiency are:

- specific milk yield, litre per cow
- net farm income per average cow, HUF per cow
- cost level, %
- index of net farm income and cost level, %

In case of companies, the figures of three indicators of the above listed, namely the net farm income per average cow, the cost level, and the index of net farm income and cost level were the highest in North Great Plain region, thus achieving the best place in the rank order according to the cumulative indicator. This is worth attention also because this region is only ranked at third-fourth place concerning the specific milk yield, while its superiority is determining regarding its achievements in cost level and in the index of net farm income and cost level. The above mentioned also support the conclusion saying that in increasing profitability and efficiency of farming it is not the most important to increase the milk yields by any means, but a rational management of the production cost is necessary.

The Transdanubian regions – otherwise benefiting favourable agro-ecological and other conditions (amount and distribution of precipitation, soil conditions, traditions, and working ethics) from the aspect of dairy farming – are not dominant in the analysis. However, the companies of Central Transdanubia take the second place regarding their specific milk yield and net farm income and the third place according to their cost level and index of net farm income per

cost level, thus they are the second in the rank order set up by the cumulated efficiency indicator. It is eye catching although that Western Transdanubia took the worst places regarding all of the analysed indicators. The economic efficiency of companies of Southern Transdanubia is only slightly better, all of the four and the cumulative indicators are below the average.

The companies of South Great Plain could not keep their leading position taken according to their specific milk yield figures, because they reached only a central position concerning the other three indicators, thus this characterises the region from the aspect of the cumulative indicator, as well. Looking at the results of private dairy farms, Central Transdanubia stands out as the region taking the best positions in all of the four rank orders, which is especially strong in case of the net farm income. Also, the Transdanubian regions are in more favourable position, which reflects that smaller farms better exploit and benefit from the ecological conditions, such as the more intense use of mainly own-produced ultimate feeds (grasslands, crop field forages). Besides the previous, all indicators, thus the cumulative indicator as well show the best position of it.

The analyses of the market decisive dairy farms and their cost and income situation even more prove the previous statements concerning milk yield, especially the example of Southern Transdanubia. Nevertheless the region's farms achieved the highest milk yields, they produced at much higher cost level. Regarding the cumulative indicator, the first three places of the rank order of the market decisive farms are taken by the same regions as it was seen in case of companies.

The analysis of the cost and income situation of dairy farming in the three different types of economic organisations of the seven Hungarian statistical regions in years 2001 to 2006 and in the period between 2004 and 2006 prove that traditional input-output analyses are reasonable to complete with complex economic efficiency analyses.

5. NEW SCIENTIFIC RESULTS

1. In the Hungarian research regarding farm economics, I have first applied the cost and income analysis of dairy farming of statistical regions.

2. For measuring the economic efficiency of dairy farming, the rank order has been set up of the Hungarian regions on the basis of a complex indicator system.

3. According to the economic efficiency analysis, the rank order of the companies producing milk is the following:
 1. North Great Plain
 2. Central Transdanubia
 3. Central Hungary
 4. South Great Plain
 5. Southern Transdanubia
 6. Northern Hungary
 7. Western Transdanubia

6. RECOMMENDATIONS

My suggestions are summarised at two different levels.

The first one is advisable for the micro-economic management. The second one may support the macro-economic management.

It is recommended for the management of the companies that in economic analysis of the performance of the farm they should treat economic efficiency analyses as outstanding aspect. These sorts of analyses give the widest information on the level of resource management.

On the emphasised economic issues of great importance of the future, the regional managers should also consider resource management and its efficiency as question of great importance.

It would be reasonable for the regional agricultural chambers (professional managing organisations) – especially for those serving as advising companies to develop simple, convenient software suitable for economic efficiency analyses. With the help of these, both data series of the farms and regional standard databases can be composed which may serve as comparison bases in various analyses.

7. PUBLICATIONS ISSUED IN RELATION TO SUBJECT OF PHD THESIS

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2. Alpár Gy.- Fejes J.- Olsovszky Á. - Sárdi J.- Széles Gy.- Schweigert A. (1996): Work organization in milk production in international comparison 4th International Symposium Kaposvár „Animal Science days” September 8-10. 165-175.p.
3. Heinrich I. - Borbély Cs. - Széles Gy. - Olsovszky Á. (1998): The competitive capacity of Hungarian milk production in the expanded European Union. Research Reports Biotechnical Faculty, University of Ljubljana 30 Agricultural Issue Supplement 6th International Symposium „Animal Science Days” September 16-18. 257-260.p.
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5. Olsovszky Á.- Széles Gy.(2008): A tejtermelés statisztikai régiók szerinti elemzése hazánkban, 50. Jubileumi Georgikon Napok Konferencia Keszthely, 2008. szeptember 25-26. CD kiadvány.