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Factors of Efficiency Change of Assets on the EU-15 and Hungarian Farms from 1990s

István TAKÁCS[1] – Zsolt BARANYAI[1] – Emese TAKÁCS[2]
[1] Szent István University, Gödöllő, [2] Corvinus University of Budapest

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„What was expected, what we observed,

the lessons learned."

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ABSTRACT

Efficiency of farm assets is a very important factor of competitive production. It could be in strong correlation with profitability of economic activities. One of the most important factor of the farm assets is the fixed assets, and as a part of it, the equipment as well. An important factor of the farm asset value is the machinery, which depends on the amount of internal resources of farms and external financial resources i.e. governmental subsidies, bank loans. But, as it could be observed during the 1980s and 1990s on the farms of developed countries, the technical development was also a considerable factor of farming. This paper, based on the data of the FADN, and yearbooks of the HCSO, focuses on the investigation of some figures of the European Union for capital efficiency between 1989 and 2003, and compares these experiences with the Hungarian changes on the farms during the 1990s.

KEYWORDS gross margin, farm number, farm structure, productivity, FADN

1. INTRODUCTION

The analysis of main factors of agriculture's means and capital efficiency is strongly related to the factors of technical development. The present paper follows the complex approach of technical development according to definition by Dimény, published in 1975. [DIMÉNY 1975]. It states that the technical development of agriculture rests on four pillars, namely biological, chemical, technical and human factors, among which „technical" includes mechanization and architecture, too. This definition basically corresponds to what the European agro-economists drafted earlier (in 1995) in Helsinki. [HUSTI 2003]

The extension of factors of agricultural technical development is closely bound up with the general social development. VADÁSZ [1980] gives a graphic example when having analysed the two-century development of Danish agriculture he stated that mechanization in modern sense appeared only in the early 20th century, the prerequisite of which was the development of internal combustion engine and engines based on it. At the same time, however, it should be considered that following the technical development (as a consequence), the increasing cost of basic means of production and labour requires increasing capital investment from the enterprising farmer. In general, he was right saying that the technical development in agriculture would lead to farm concentration and further specialization of production. Furthermore – from economic point of view – one of the most important outcome of scientific-technical development is that it will increase the yield per unit and raises the productivity of labour.

At the same time we have to see, that the content of definition of technical development is permanently expanding. By today – due to the general technical and social progress – the above mentioned factors should be complemented with further factors, especially with information. [KÉSMÁRKI GALLI 2006]

The technical development in general, and in the agriculture, is not autotelic, but, through its social impact, contributes to the gross domestic product, the satisfaction of consumption needs, the easing of labour and meeting other social requirements. That's why it is justified to examine, related to technical development, the cost efficiency in its narrow sense, and furthermore the efficiency in wider sense. [DIMÉNY 1992]

The development of agricultural production factors hides a deliberate human action which is part of an innovation activity system influencing production factors. [HUSTI 1993]. As we have seen, however, in Hungary in the 1990s, its continuity and flow depends also on the social condition system. The key to development is in innovation activity, which highlights the satisfaction of market needs, thus combining knowledge and entrepreneurial drives, skills and possibilities. [HUSTI 1998]

Regarding the analysed topic, it is important to explore the way of measuring technical development and its efficiency. KÉSMÁRKI GALLI [2006] gave detailed treatment of this topic. The present paper systematizes only those points which support the approach of our research introduced below.

The problem is the quantified correlation between technical progress and economic growth. One of the first analytical approach was the production function. An ever-since widespread form of this is based on Cobb-Douglas production function [PAKUCS 2003], which is to justify the validity of marginal productivity. The relation ($Q = f(K,L)$) contains two independent variables: labour (L) and capital (K). The critics on the function demanded the development of a restructured function. The application field of Cobb-Douglas production functions have expanded significantly by the spreading of growth theory.

The involvement of technical development into expansion theory models started only in the 1950s. KALDOR [1957] was the first to introduce the function of technical progress, which included all the types of technical development. It said that the main driving force of economic growth is the technical change: new technologies require new investments and the growth can be explained only with the common changing of capital/production quotient. A lot of authors contributed significantly to the development of growth theories, but SOLOW [1957] must be highlighted, because he complemented the general formula of production function by considering the impact of technical progress: $Q = f(K, L, t)$, where „t" means the impact of technical progress in relation to time. Solow improved this in his subsequent works and highlighted that productivity has much bigger role in the growth of production than the expansion of production factors.

While the former theories examined the growth under pure market conditions, the economic trend of Keynes gave new direction when criticized the points of neo-classical school and argued for the necessity of state intervention. [KEYNES 1965] Keynesian economists criticized the production function and the theory of marginal productivity. The basis of their criticism was that capital – as against to other factors of production – has no natural measure. Common measure of different capital assets can be only the price. The price system, however, depends on the income distribution system. By changing it, the price system will change and the price of capital assets changes, too, together with the marginal productivity of capital, without changing the physical productivity of capital. We have to face this when we deal with the capital efficiency of the European Union agriculture, because the role of the state is very, sometimes irrationally significant.

Returning to the relations between elements of technical development defined above we can refer to the trend-line theory of JÁNOSSY [1966], according to which the quantity and quality level of human capital determines the course of economic growth. Economic trend means the long-term development line of economy, the upper envelope of development curve with non-significant (accidental) amplitude level. The theory underlines the role of labour qualification, the changes of which contributed to the decline in technical progress in Hungary in the 1990s.

The measurement of impact of technical development is a complex task, because technical development includes all those changes in the production process in relation to time which produces more (or more valuable) products by using the same (or less) production factors, and produces the same (or more valuable) products with less production factors. Technical progress in general should increase output as a result, should change its structure positively, and cut production costs. [ANDRÁSSY 1998] The interrelation of these two factors determines the efficiency. In case of this we have to distinguish technological efficiency (relation of income and cost) from economic efficiency (proportion of production value and production cost). [NEMESSÁLYI ZS. – NEMESSÁLYI Á. 2003]

One of the most widespread analysing method of technical development efficiency is the calculation of partial efficiency, where the change of productivity (y/L) is determined in the function of productivity of labour and the productivity of capital: as the multiplication product of capital efficiency (y/K) and technical equipment (K/L):

$$\frac{y}{L} = \frac{y}{K} \cdot \frac{K}{L}$$

Internal or international comparison of this index points out that the productivity differences can refer back to the differences between capital productivity and capital supply (capital stock per head). [KÉSMÁRKI GALLI 2006]

Therefore, the changes of efficiency of means, embodying capital, are the result of a complex process. We can gather information about the changes of each factor in an empirical way: we can see that the production potential of biological basis (varieties involved in production) has grown in the last decades as the result of technical progress. In our days this objective is served by biotechnology, too, in addition to traditional breeding means; the chemical background of production has been growing dynamically; a lot of new methods enhancing nutrient utilization have been introduced; and new materials have been implemented to fulfil the micro-element needs of crops and animals. Environmental protection criteria have been observed more precisely; the quantity of pesticides has been reduced, new technologies have been introduced (for example precision farming) [TAKÁCSNÉ GYÖRGY 2006], with the appropriate modern, heavy-duty machinery. Technical development serves the idea of sustainable development more and more significantly.

The research aimed to explore the changes of factors which influenced the means and capital efficiency in the last fifteen years in the former 15 member countries of the European Union and primarily in Hungary among the countries integrating in 2004. We have examined the possible impact of identified factors on the competitiveness of Hungarian farmers and their ability to react on the changes of world economy and the results of technical development of competitors.

2. MATERIAL AND METHODS

The examination has used secondary data: data of EUROSTAT, the Hungarian Central Statistical Office and the FADN database of the European Union. The examined period was from 1989 to 2004. Data were available arranged (in 6 groups) according to economic farm size (ESU) for 12 countries up to 1994, 15 countries up to 2003 and 25 countries from 2004. Out of the 152 standard variables in the database, the following variables have been used for the research: number of represented farms, average labour use, average area utilized, average yield of winter wheat and maize, average milk yield, gross production value, total means, invested means, out of this machinery. 10646 data per variable were available for the examinations.

The examinations were made with simple statistical methods (average, standard deviation, coefficient of variation calculation).

Efficiency is a general concept. Expression of economic efficiency can be approached in multiple ways, but the primary evaluation is mostly done by productivity indices. Productivity means for us the output (product quantity, production value) produced with one resource unit used in production.

$$\text{Efficiency index} = \frac{O}{I} \text{ or } \frac{I}{O}\text{, where}$$

- O=outputs: yields (t/ha), production value (c.u./ha), variable gross margin (c.u./ha);
- I=inputs: area (ha), capital value of investment goods (c.u.).

In order to analyse partial efficiency, we calculated the changes of technical equipment (K/L) and capital efficiency (y/K) for the EU-12/15/25 countries.

During the research we have analysed the impact of changes of factors. The method we used was the progress survey which describes changes in their process, the inherences in their dynamics and development, contrary to the traditional, static examinations. [NÁBRÁDI – FICZERÉNÉ NAGYMIHÁLY 2007] The condition of analysis is on the one hand, the availability of homogenous time series, and, on the other hand, the unified identifier of analysed units, with the help of which the data of units can be reliably identified in the consecutive dates. The point of the method is that the volume categories are made on the basis of full-range data stock of the examined index. These volume categories are put in the head and side column of tables under examination. The units are placed in the cells of the table – following the identification – according to the volume of their examination value in the examined 't' period (side column) and 't+1' period (head cells). Thus the table diagonal contains those units, where the examination factor was similar in the examined 't' and 't+1' date. Those units are above the table diagonal, where the volume of the examined factor increased from date 't' to date 't+1', those units are below where the volume of the examined factor decreased. [GUNDEL – LACZKÁNÉ 1995]

Furthermore, for the evaluation of research results we have also applied grouping on the basis of relative deviation from the average of grouping points (X, Y), for the elements of partial efficiency (capital efficiency, technical equipment), according to the following relation:

$$P(x, y) = \left(\frac{(x_i - \overline{X})}{\overline{X}}; \frac{(y_i - \overline{Y})}{\overline{Y}} \right)$$

The elements have been divided into four groups (G1-G4) according to their deviation from the average. Identifying names have been given to the groups on the basis of their characteristics.

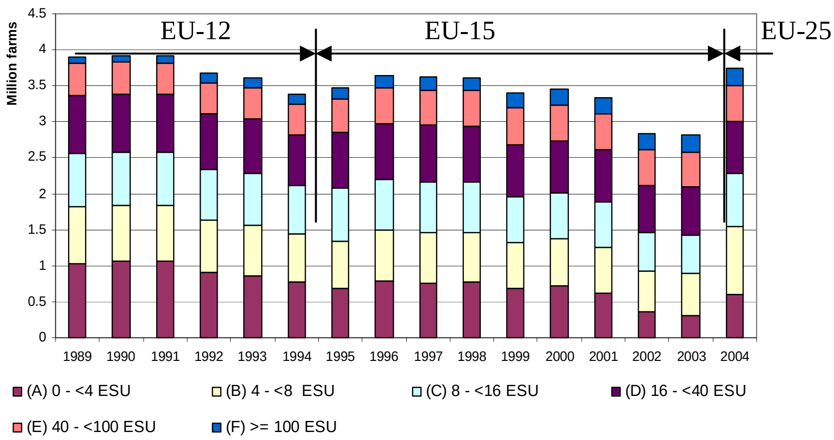
The introduction of results – due to their size – is made only for countries which have significant role in the agricultural production of the Union. More than 80% of gross added value of the EU-25 member and two later accessed countries was produced by 7 countries in 2005: Germany, Greece, Spain, France, Italy, the Netherlands, and the United Kingdom. Within the Eastern-Central European region, the performance of Poland was significant. Hungary has only a 1.4% share from it, in spite of the fact that its share from the resources is 3.6% regarding agricultural land and 4.6% regarding agricultural labour use (Table 1). Following the Pareto principle, only these countries are examined in the following, although in this way some countries which have model development and high-level agriculture in some aspects, will be left out.

3. RESULTS

The development of the European agriculture in the 1990s and 2000s lack the development dynamics of the former decades. Priorities have changed, instead of the former production intensification, the stabilization or small improvement of income situation of farmers has become the objective without increasing the output volume. The implementation of more extensive production methods (land resting, organic production) has been definitely supported. At the same time, technologies utilising the results of technological development have emerged which helped to carry on rational farming – with more and more expensive means – thus contributing to the decrease of input and stabilization of yields. It can be seen that the development has led to farm concentration and to the increasing of live labour productivity, which ultimately resulted that significant labour capacity became redundant. The experiences are supported by the figures, as it can be seen below.

3.1 Farm concentration

The process of farm concentration is obvious in the European Union. The number of farms (Table 1) shows a decreasing tendency (Figure 1), the break is caused by the extension processes (Eastern-German provinces, Scandinavian countries, Austria, integration of the Eastern and Central European countries in 2004).



Source: own figure on the basis of FADN

Figure 1 Number of represented farms in the EU-12/15/25 country groups.

Restructuring can be observed in farm structure: the average economic farm size is growing (Table 2). While the number of farms was decreasing, the land under cultivation did not decrease, but slightly increased (Figure 2).

Concentration has based the implementation of modern and efficient technologies and given indirect proof of increasing productivity (efficiency) in agricultural holdings, the possible source of which is the technical development. The next question is: how the efficiency of labour has changed.

3.2 Changes of labour utilization and its productivity

Labour use has been permanently decreasing. Labour use in the EU-15 country group has been reduced by about 40% (annual labour capacity of 2.2 million persons) in 14 years (Figure 3). At the same time, the efficiency of live labour has shown significant differences between farm groups. The efficiency has shown increasing tendency in all the groups, the rate of growth was quicker in the smaller plant size categories. The productivity of live labour in large-scale farms was almost 7-fold of that of small-scale farms 15 years ago. This difference has been decreasing, because the productivity of live labour is 45% in small-scale farms, while the growth in large-scale farms was only about 15% (Table 3).

When examining the productivity of live labour in arable land crop production in some of the member countries, it is presumable that the proportion of part-time farms is big, that's why the productivity index is more positive in this category than in medium-scale farms. The natural productivity index of live labour in Hungary is above the EU average in most of the size categories. Data also verify that live labour need of arable land crop production is low in most of the member countries.

The production value made per one live labour unit is very changeable (Tables 3 and 4). In 15 years, the productivity of live labour has grown by 41% in the average of the EU-12/15 and 33% in the EU-25. When examining by economic size, there is 10-fold difference between the smallest and the largest size category. This difference is due to the technical development, especially to the differences of mechanization. The productivity differences between countries are very considerable in the smaller farm-size categories. The highest standard deviation is almost 23-fold (the Netherlands) compared to the average of the given size category. The variance of upper size categories is significantly smaller which can be definitely explained – as it was experienced – with the similar technical-technological level.

Table 1 Number of agricultural holdings in the European Union

	Number of agricultural holdings[1]	Distribution	Utilised agricultural area[2]	Distribution	Gross value added[3]	Distribution	Agricultural labour force[4]	Distribution
	1000 pcs	%	1000 ha	%	M EUR	%	1000 AWU	%
EU-27	9 870.6	100.0	164 051	100.0	127 162	100.0	9 804	100.0
EU-15	6 238.6	63.2	130 547	79.6	116 758	91.8	6 290	64.2
Belgium	54.9	0.6	1 386	0.8	2 282	1.8	70	0.7
Czech Republic	45.8	0.5	3 606	2.2	1 004	0.8	152	1.6
Denmark	48.6	0.5	2 712	1.7	2 449	1.9	58	0.6
Germany	**412.3**	**4.2**	**17 035**	**10.4**	**13 909**	**10.9**	**689**	**7.0**
Estonia	36.9	0.4	770	0.5	195	0.2	37	0.4
Greece	**824.5**	**8.4**	**3 805**	**2.3**	**6 349**	**5.0**	**614**	**6.3**
Spain	**1 140.7**	**11.6**	**25 690**	**15.7**	**22 450**	**17.7**	**998**	**10.2**
France	**614.0**	**6.2**	**29 632**	**18.1**	**21 281**	**16.7**	**914**	**9.3**
Ireland	135.3	1.4	4 307	2.6	1 711	1.3	160	1.6
Italy	**1 963.8**	**19.9**	**14 710**	**9.0**	**25 019**	**19.7**	**1 476**	**15.1**
Latvia	126.6	1.3	1 734	1.1	237	0.2	137	1.4
Lithuania	272.1	2.8	2 837	1.7	417	0.3	222	2.3
Luxembourg	2.5	0.0	129	0.1	96	0.1	4	0.0
Hungary	**773.4**	**7.8**	**5 864**	**3.6**	**1 747**	**1.4**	**463**	**4.7**
Netherlands	**85.5**	**0.9**	**1 924**	**1.2**	**8 147**	**6.4**	**186**	**1.9**
Austria	173.8	1.8	3 263	2.0	2 190	1.7	175	1.8
Poland	**2 172.2**	**22.0**	**15 906**	**9.7**	**5 689**	**4.5**	**2 274**	**23.2**
Portugal	359.3	3.6	3 722	2.3	2 338	1.8	455	4.6
Slovenia	77.2	0.8	509	0.3	402	0.3	95	1.0
Slovakia	71.7	0.7	1 941	1.2	381	0.3	99	1.0
Finland	75.0	0.8	2 267	1.4	516	0.4	84	0.9
Sweden	67.9	0.7	3 201	2.0	863	0.7	71	0.7
United Kingdom	**280.6**	**2.8**	**16 761**	**10.2**	**7 160**	**5.6**	**336**	**3.4**

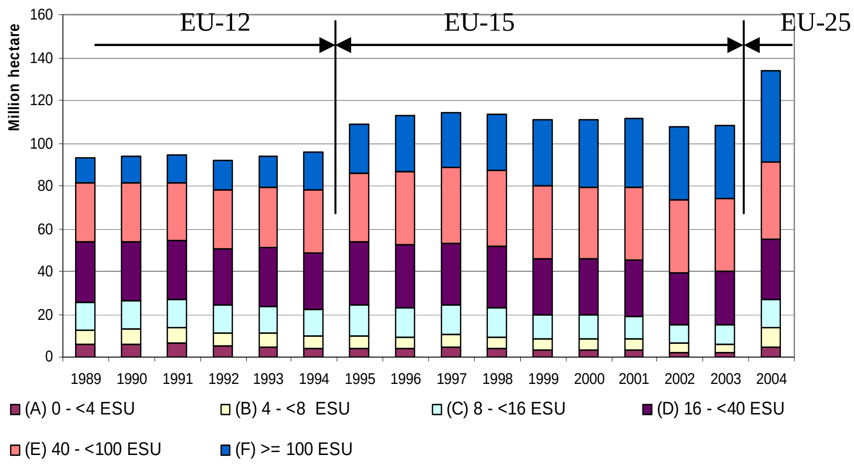
1) 2003; 2) Estonia, France, Ireland, 2004; EU-25, EU-15, the United Kingdom, 2003; 3) at producer prices of agricultural industry, 2005; 4) 2005, Germany, Greece, Spain, France, Ireland, Italy, the Netherlands, Austria, Portugal, 2003

Source: EUROSTAT 2007

Table 2 Number of farms in categories of economic farm sizes (1990=100%) (%)

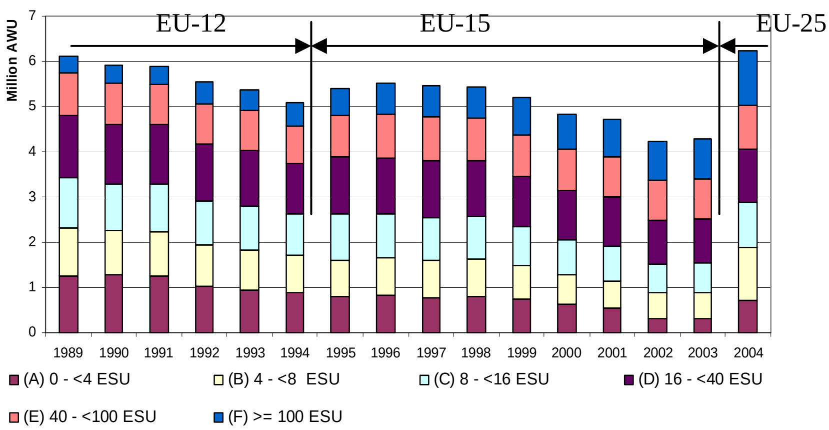
	0 - <4 ESU	4 - <8 ESU	8 - <16 ESU	16 - <40 ESU	40 - <100 ESU	>= 100 ESU	Total
EU-25	41.0	97.4	99.1	102.9	112.9	230.7	85.0
Germany	52.7	52.7	39.0	91.8	93.1	1321.6	63.6
Greece	69.8	77.7	99.5	138.2	287.9	9.4	86.9
Spain	22.8	50.9	68.5	132.8	307.6	312.4	67.7
France	63.5	63.5	43.3	46.4	91.1	240.0	70.0
Italy	17.4	76.0	84.6	90.8	91.0	135.2	58.7
Netherlands	63.3	63.3	63.3	77.4	59.4	125.5	68.3
United Kingdom	65.5	215.3	12.9	76.4	90.7	130.8	97.0

Source: own calculation on the basis of FADN



Source: own figure on the basis of FADN

Figure 2 Total land used by the represented farms in the EU-12/15/25 country groups.



Source: own figure on the basis of FADN

Figure 3 Changes of live labour used by the represented farms, in the EU-12/15/25 country-groups.

Table 3 Changes of natural productivity of live labour in the EU-12/15/25 country groups (ha/AWU)

Year	Live labour natural productivity index for all the represented farms						
	0 - <4 ESU	4 - <8 ESU	8 - <16 ESU	16 - <40 ESU	40 - <100 ESU	>= 100 ESU	Total
1990	4.7	7.5	12.6	21.0	29.9	30.7	16.6
1995	4.9	7.4	13.9	23.8	35.0	36.8	20.1
2000	5.6	7.5	14.6	24.3	36.9	39.4	23.2
2004	6.5	7.8	13.1	24.2	37.6	35.3	21.5
Member countries	Live labour natural productivity index in field crop production in 2004						
	0 - <4 ESU	4 - <8 ESU	8 - <16 ESU	16 - <40 ESU	40 - <100 ESU	>= 100 ESU	Total
EU-25	8.0	10.2	18.4	31.8	55.2	54.8	31.2
Germany	41.6	41.6	..	31.5	50.2	67.7	..
Greece	4.5	6.0	8.1	12.4	17.3	..	..
Spain	12.6	23.7	36.0	54.1	85.2	24.3	42.3
France	52.4	52.4	19.2	35.0	61.9	76.0	55.8
Italy	19.2	7.7	12.5	17.5	30.6	35.4	17.1
Netherlands	19.3	19.3	19.3	12.2	18.1	37.8	21.6
United Kingdom	63.7	63.7	..	56.3	65.6	88.3	..
Hungary	21.0	24.0	43.2	58.8	55.5	47.7	40.9
Poland	6.6	8.2	12.9	23.6	46.5	60.5	13.0

Source: own calculation of the basis of FADN

3.3 The changes of performance (yield) of biological bases

The biological bases have not changed significantly during the examined period. The variance of national averages is relatively small (coefficient of variation is 4-6%) while the differences between countries are large. There are high average values (above 7 t/ha) in cereal production of Belgium, Denmark, Germany, France, Ireland, the Netherlands and the United Kingdom. In these countries the chemical use (fertilizers and pesticides) is also above the average. Medium yields (4-7 t/ha) are registered in cereal production of Italy, Luxembourg, Austria and Sweden and low yields (below 4 t/ha) in Greece, Spain, Portugal and Finland, with rather high (14-22%) coefficient of variation. During the recent years (following a significant decline in the early 1990s), Hungary has returned from the low-average-yield group to the medium yield category again, but the yield uncertainty is high. The reason for the low yield is in the low level of inputs because the biological bases are mostly able to produce the same performance. The yield increase is due to the gradual growth of active agent utilization.

The other important performance indicator is the milk yield, which is very characteristic for the level of animal husbandry. The differences between countries are smaller than in arable land yields. The country averages are around 6-7000 kg/year in milk yield. The coefficient of variation of average yield is usually low (2-8%). As regards the average productivity, only Greece is beyond the level of the other countries, the coefficient of variation is above 70%.

The balanced high yields show the common effect of high-performance biological bases, the high input and adequate technology, which can compensate the quality differences of soil and the impact of unfavourable and changeable weather under open-air conditions, too.

3.4 Changes of fertilizer and pesticide use

There is a high value of fertilizer and pesticide use in the countries of the European Union. The value per area unit has not changed significantly during the 15-year period. With small fluctuations, it has remained on the same level, 90-100 EUR/ha was spent on fertilizers and

80-90 EUR/ha for pesticides in the EU-15 level. The cost of agents is increasing together with the farm size in almost linear tendency. It is varied between 60-110 EUR/ha in case of fertilizers and 35-120 EUR/ha in case of pesticides. Agriculture of the Netherlands and Belgium is using these agents significantly above the average.

3.5 Changes of productivity of live labour and capital employed in production

Following the examination of factors of technical development, the changes of efficiency were also analysed. Tables 4-7 and Figure 4 demonstrate some numerical results of analyses. The productivity of live labour utilised in agricultural holdings is obviously showing an increasing tendency. In 14 years, the average growth rate of gross production value per head was about 500 EUR per year in the EU average. The EU extension in 2004 caused the decline of this index (Table 4), due to the moderately developed agricultural sector of the integrated countries.

The average level of technical equipment was high in the agricultural holdings of the European Union member countries and this level has been constantly rising (Table 5). The technical equipment of smaller farms is significantly higher than in the other economic size groups. This raises means efficiency problems, that is the production value produced with one unit of means is lower than the average.

The member countries and farm types were grouped on the basis of partial efficiency indices (Figure 4). On the basis of deviation from the Union average, the countries were put into four groups, namely as follows: Group 1: countries with above-the-average technical equipment and capital efficiency (the clever rich) (Denmark, Germany, Belgium and the Netherlands); Group 2: technical equipment is above the average, but the capital efficiency is below the average (the waster rich) (Luxembourg, Austria, Finland, Sweden, and France); Group 4: technical equipment is below the average, but the capital efficiency is above the average (the clever poor) (Great Britain, Spain and Slovakia); Group 3 and the other 12 have both the technical equipment and the capital efficiency below the average (the waster poor). As regards the comparison by farm types, the horticultural farms, grazing animal husbandry and the farms with permanent crops show good performance. The dairy farms are in bad situation, the arable land crop production (fieldcrops) farms are well-mechanized, but they utilize their means with a capital efficiency below the average. When examining farm assets in three levels (machinery, fixed assets, total assets), the movement between efficiency groups was obvious due to the impact of equipment structure (Table 6).

The development survey of countries shows that in case of some countries, the improvement of technical equipment was not followed by growing capital efficiency (Italy). Capital efficiency of Denmark was declining (moved from G1 to G2). The United Kingdom made technical improvement and, in the meantime, did not considerably decreased capital efficiency (from G4 to G1). (Table 7)

4. CONCLUSION

The European Union is the community of countries with moderately or highly developed agriculture. During the last decades, considerable resources were spent on the technical development of the branch through the agricultural policy of the Union and the nations. The result of the process is that the technical supply increased in many countries, and the indices of technical equipment have high values. At the same time, however, the efficiency of production has deteriorated.

Table 4 Productivity of live labour in the EU-12/15/25 country groups

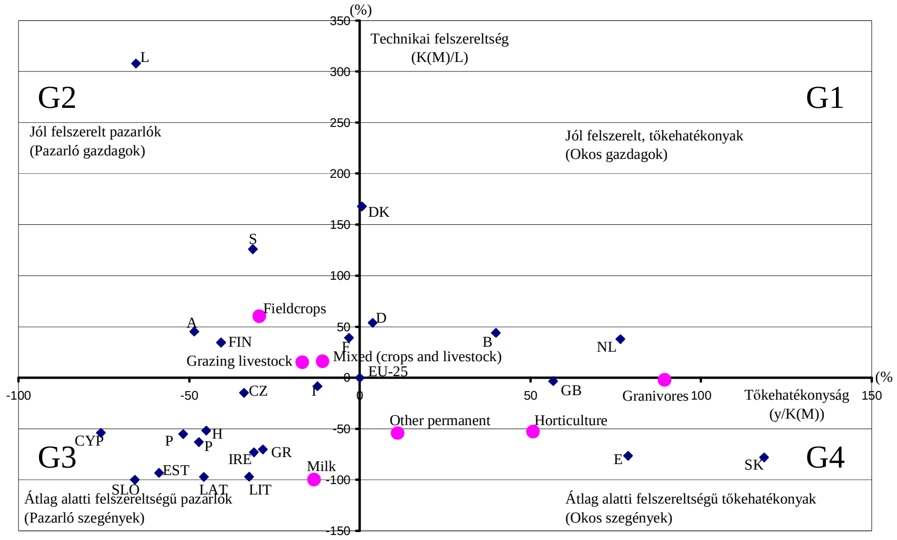
Year	Average of the EU-25 (EUR/capita)	Live labour productivity compared to the EU-25 average (%)					
		0 - <4 ESU	4 - <8 ESU	8 - <16 ESU	16 - <40 ESU	40 - <100 ESU	>= 100 ESU
1990	15441	117.6	63.2	62.5	97.8	108.7	100.0
1995	17990	115.0	62.6	63.6	88.4	107.7	100.0
2000	20868	121.6	59.5	49.9	88.4	104.8	100.0
2004	18814	116.1	47.9	59.9	99.8	124.9	100.0
Member country		Deviation of live labour productivity from the EU average (%)					
EU-25		100	100	100	100	100	100
Germany		167	160	..	207	100	89
Greece		10	17	61	65	20	..
Spain		12	22	76	87	71	70
France		156	152	..	140	86	78
Italy		92	28	83	109	90	111
Netherlands		271	265	643	15	171	191
United Kingdom		163	156	..	3	165	110
Hungary		..	15	65	64	33	39
Poland		12	18	46	50	40	51

Source: own calculation on the basis of FADN

Table 5 Technical equipment in the EU-12/15/25 country groups

Year	Average of the EU-25 (EUR/capita)	Technical equipment compared to the EU-25 average (%)					
		0 - <4 ESU	4 - <8 ESU	8 - <16 ESU	16 - <40 ESU	40 - <100 ESU	>= 100 ESU
1990	25232	131.3	48.6	56.3	74.4	62.5	100.0
1995	27716	131.0	54.4	57.5	64.1	56.5	100.0
2000	32622	139.5	54.3	47.0	57.5	62.5	100.0
2004	29870	135.3	57.3	61.4	60.6	70.1	100.0
Member country		Deviation of technical equipment from the EU average (%)					
EU-25		100	100	100	100	100	100
Germany		149	143	..	102	108	119
Greece		14	22	67	80	53	..
Spain		13	17	35	44	49	47
France		161	156	0	96	101	72
Italy		101	39	115	118	151	121
Netherlands		133	131	309	21	156	190
United Kingdom		160	153	..	5	68	83
Hungary		..	39	120	104	86	105
Poland		23	28	93	103	102	115

Source: own calculation on the basis of FADN



Source: own figure on the basis of FADN

Figure 4 Classification of the EU-25 countries according to partial efficiency (technical equipment and capital efficiency) (2004)

Table 6 Partial efficiency by capital levels ((M): machinery; (F): fixed assets; (T): total assets) (2004)

Denomination	Position in partial efficiency matrix according to asset category			Frequency in group				Rate of specific assets from total assets	
	Machinery	Fixed assets	Total assets	G1	G2	G3	G4	M/T%	F/T%
Germany	1	2	2	1	2			10.8	83.3
Greece	3	3	3			3		10.5	97.5
Spain	4	3	3			2	1	4.2	69.3
France	2	4	4		1		2	20.2	65.5
Italy	3	2	2		2	1		8.6	92.6
Netherlands	1	2	2	1	2			5.6	85.3
United Kingdom	4	1	1	2			1	8.1	81.8
Hungary	3	3	3			3		19.7	79.6
Poland	3	3	3			3		22.1	85.8
Fieldcrops	2	2	2		3			12.5	82.8
Horticulture	4	4	4				3	13.3	76.9
Other permanent crops	4	3	3			2	1	8.0	84.1
Milk	3	3	3			3		9.1	87.7
Grazing livestock	2	2	2		3			8.8	81.7
Granivores	4	4	2		1		2	11.0	77.0
Mixed (crops and livestock)	2	1	1	2	1			13.1	80.3

Source: own calculation on the basis of FADN

M/T%= proportion of machinery from total means (%); F/T%= proportion of invested means from total means (%)

Table 7 Progress examination of partial capital efficiency of total capital in the EU-15 member countries (1995/2000/2004)

	Group 1	Group 2	Group 3	Group 4	2000	Group 1	Group 2	Group 3	Group 4	2004
Group 1	**2**	1			3	**1**			1	2
Group 2		**3**	1		4	1	**5**	2		8
Group 3		1	**4**	1	6			**3**	1	4
Group 4				**2**	2				**1**	1
1995	2	5	5	3	15	2	5	5	3	15

Source: own calculation on the basis of FADN

The final conclusions of examinations on the basis of statistical and FADN databases are as follows:

- The productivity of live labour has increased in the EU agriculture, which resulted that the annual labour use has decreased by more than two million persons in the last 15 years, besides increasing output;
- The biological bases ensure stable production in the EU, and the potential fertility has not changed significantly (the effect of GMO has not appeared in Europe yet);
- Production in a group of countries is made with high input, which contributes to the balancing of production, but the cost impact is also significant;
- When forming efficiency groups, it is obvious that the dominance of the wasting poor is significant (almost half of the member countries belong to this group and most of them from the newly accessed countries);
- The agriculture of Hungary is at competitive disadvantage in this comparison. The preparation decade was spent with extensive development, climbing back to the former level, which is behind the level of the most developed and some of the moderately developed countries.

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