The Structure of Individual (Family) Farms in Hungary

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ABSTRACT

In 2003 a research study looked at the position of smallholders; the survey was carried out using questionnaires and interviews. The 613 farms included in the survey were situated in 3 counties in the Southern Great Plain of Hungary and in 3 counties of the Western part of the country (Transdanubia). The results of the survey showed that there was a firm tendency of concentration among the Hungarian individual farms. Though their average size is about 3 ha, the number and area of farms over 50 ha size are rapidly growing and taking a significant part of the total individual agricultural area. The number of small farms is great but their total farming area is relatively small. The concentration takes place primarily due to renting. The land market is sluggish mainly owing to the land-buying restrictions and the small intention to sell of those owners who are waiting for higher prices. Land prices are low but rising, especially on the western border of the country, near to Austria.

Key words: agricultural production, efficiency, family farms, land tenure, land use.

1   INTRODUCTION

In 2003 a research study looked at the position of smallholders; the representative survey was carried out using questionnaires and interviews (BURGER; SZÉP, 2006). The farms included in the survey were situated in 3 counties in the Southern Great Plain of Hungary and in 3 counties of the Western part of the country (Transdanubia) (see Figure 1). The specific counties were, in the Southern Plain Bács-Kiskun, Békés and Csongrád; in the western part of Hungary the counties included Győr-Moson-Sopron, Vas and Zala. We received replies to the questionnaires which could be usefully used in the survey from 613 family farms (see Table 1).

In this paper the tables, figures, and statements refer to the farms of the survey except in cases where an other source is referred to.

Table 1:   Number and area of farms in the two regions

Farmers	Southern Great Plain			Western Transdanubia		
	Number	Area ha	Average area ha	Number	Area ha	Average area ha
Entrepreneurs[*]	49	3072.40	62.70	46	2381.56	51.77
Smallholders[**]	180	2262.10	12.57	195	2286.00	11.72
Family farmers[***]	74	3230.00	43.65	69	3836.30	55.57
All	**303**	**8564.50**	**28.27**	**310**	**8503.86**	**27.43**

[*]Farms which are obliged to provide data for statistics regularly and to pay taxes.
[**] Farms which are not obliged to provide data for statistics regularly and to pay taxes till a certain income limit.
[***] Farms which are also not obliged to provide data for statistics regularly and to pay taxes till a certain income limit but one family member is a full-time farmer and the other family members are helping on the farm. This legal form was created by the 1998-2002 center-right government in the interest of preferential support.

Figure 1:   Map of the Hungarian counties

One of the aims of the study was to acquire a general picture of the state of family farms. A second aim was to compare the situation in the Southern Plain (a region which is far from the growth centre of the capital and the Western border of the country) with that in the 3 counties of the western part of Transdanubia. The Western border of the country is near to Austria, it is more industrialized, it is supplied with more foreign investment, has better transport roads, more services, more tourists and the per capita GDP and employment is higher than in the South Plain. However, in the Southern Plain the agricultural sector has a more dominant role.

SCHULTZ (1953), when developing further the theory of PERROUX (1950) about the economic advantages of market proximity, stressed that in the industrial and urban areas, where the trade of produce and means of production are significant, agriculture develops faster than in the areas further from centers of growth. We wanted to investigate whether this theory could be proved in our survey.

We surveyed and analyzed the following features of the respective farms: farm structure; land tenure; labor force; production; yields; trade; capital stock; credits; subsidies; profitability; intentions for development; and prospects for the future. We were also interested to find out what sort of differences had taken place in the situation of individual farms since the questionnaire survey we carried out in 1998 with respect to individual and corporate farms in 11 Hungarian counties (BURGER et al. 1999; BURGER, 2001). In this paper we deal with the results of the survey concerning land tenure and land use.

2   METHODS

The survey was carried out with interviews using questionnaires. Most of the questions asked referred specifically to the year 2003. However, questions related to the financial situation (i.e. credits, subsidies) and to the economic results of the respective farms concerned the previous 3 years. The selection of the units was random but it did not comply with the classic conditions for random sampling. Furthermore, we did not carry out corrections with regard to under- or over-representation. Thus we had no intention of drawing conclusions from our results which could be taken as valid on either the regional or national levels. In the course of making comparisons between official national or international statistics, the aim was not to look for identical data but for similar tendencies.

The survey focused on the cultivated farm area. The processing of data was carried out according to farm sizes, age-groups of the holders, and their level of education. 2 mentioned regions were distinguished. There were some instances when the counties were treated individually. The size categories of the holdings were, respectively (in hectares): 1-5, 5-10, 10-20, 20-50, 50-100, and those above 100. Units below 1 hectare were not examined. The age-groups were the following: under-40, between the ages of 40 and 50, and those above 50. The levels of education were: elementary (primary) school, secondary school, and higher education.

In dealing with the wide range of elements concerning the efficiency and profitability of the farms, mathematical-statistical methods were employed. On the one hand, the model used regression analysis; on the other hand, in order to classify the main characteristics of the farms, cluster analysis was applied.

3   THE CONCEPT OF FAMILY FARM

CHAYANOV (1966) regarded as a major feature of family farms the fact that they do not aim to maximize their profit, as does a capitalist farm, but to maximize the consumption of the family members. In family farms the output optimum will be reached at a level when the marginal sacrifice of labor of the working family members will equal the marginal utility of each consumer in the family. RAUP (1986) characterizes the family farms as organizations in which the family controls the means of production, the land and the labor force. GASSON and ERRINGTON (1993) describe family farms as entities in which the ownership is identical with the management and this is inherited through generations and secured by kinship or marriage. DJURFELDT (1996) stresses the unity of production, consumption (household) and kinship in family farms and the importance of the work of the family. We regarded those small farms as family farms (BURGER 1994) which are managed and largely worked by the members of a family and farmed on own and/or rented land.

4   LAND TENURE

Examining the sizes and number of farms involved in the survey, an inverse tendency can be noticed: the larger the area of the holdings, the smaller their number (see Table 2). This indicates a concentration of the agricultural area (although we did not examine the dynamics of this process). The tendency towards concentration reinforced the conclusions we had made in our survey of 1998; it could also be supported with dynamic data on the national level and from other sources (Agriculture in Hungary 1996, 2002, 2004; TAKÁCS, 2005; CZIMBALMAS and FEHÉR, 2004).

According to the national statistics the number of individual farms under 1 ha decreased from 81.4% to 71.9% of the total number between 1994 and 2000 and their area decreased from 16.8% to 6.8%. During the same time the area of individual farms larger than 50 hectares grew from 15.5% to 30.8% and by 2003 to 39%. However, the average individual farm size was still 3 ha in 2003.

Table 2:   Number and area of farms according to farm sizes

Farm sizes	Number	Area ha	Average area ha	Percentage Number	Percentage Area ha
1-5 ha	197	589.40	2.99	32.14	3.45
5-10 ha	107	802.00	7.50	17.46	4.69
10-20 ha	114	1664.50	14.60	18.60	9.73
20-50 ha	113	3541.06	31.34	18.43	20.71
50-100 ha	49	3429.70	69.99	7.99	20.06
Over 100 ha	33	7041.70	213.38	5.38	41.18
All	**613**	**17098.36**	**27.89**	**100.00**	**100.00**

The concentration had primarily taken place due to renting. The larger the holdings are, the more land they rent. While in the lowest farm size category rented units represent 6%, in the largest category the equivalent figure is 42%. (seeTable 3). It is not only those with the larger farms who are renting more land; it was also recognized that more people in the youngest age group are involved in renting. (see Figure 2). According to the survey, farms above the size of 100 hectares show a significantly higher proportion of rented land in Western Transdanubia than is the case in the Southern Plain. With respect to the latter point, it is possible that the renting of land for agricultural purposes by foreigners plays a role in this process.

Table 3:   The share of cultivated own and rented farm land

Farm sizes ha	Own land area	Rented land area	Other cultivated land area	All cultivated area
1-5	94.1	4.8	1.2	100.0
5-10	96.2	3.8	0.0	100.0
10-20	85.7	11.9	2.4	100.0
20-50	76.1	21.0	2.9	100.0
50-100	71.8	23.7	4.5	100.0
Over 100	58.3	37.6	4.0	100.0
All	**70.4**	**26.1**	**3.4**	**100.0**

Figure 2:   Rented farm areas according to age groups of farmers
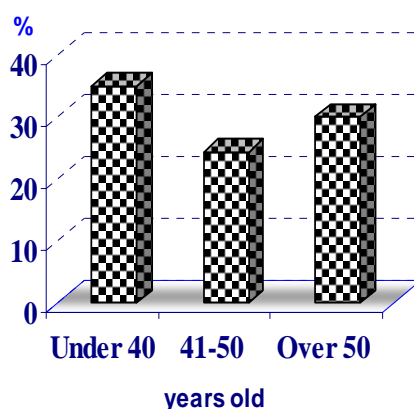
4.1 Land market

The market for the purchase and sale of agricultural land is weak. The reasons for this are the following:

- The demand for land is low. This is partly due to various restrictions with respect to purchase and partly due to the fact that the income from farming is low. In 1994 a law was passed which forbids the purchase and ownership of agricultural land (and other real estate) by cooperative and corporate farms, and by foreigners. During the course of the negotiations leading up to Hungary's accession to the European Union (EU), Hungary - like other transition countries – requested and received a 7-year derogation from EU rules concerning the freedom of any natural and legal individual citizen of an EU member-state to purchase agricultural land (GROVER 2003). The reasoning of the negotiators was that with land prices being so low in Hungary it would make it possible for foreigners to buy large areas of land at cheap prices, thus causing the problem of land scarcity for domestic farmers.

- The size of ownership and use of land by an individual are also limited (to 300 hectares) by law.

- Due to problems related to the registration and assignation of some parcels of land, as well as the long duration of legal processes concerning the ownership of some properties, the actual ownership situation of large areas of land remains uncertain. Owing to the lack of consolidation, many scattered parcels cannot be sold. There is still approximately 1.5 million hectares of land which is undivided in corporate farms, being under the ownership of individuals who worked on the farm when it had a cooperative status, or in the hands of descendants of the corporate farms. Owing to the scattered nature and position of these parcels within the area of much larger fields it is impossible to sell them.

- The supply of agricultural land is also meager. During the course of the privatization of land a significant proportion of agricultural land was returned to the descendants of its former owners or to other people not associated with that land. Most of the latter had no connection with agriculture and were living in towns. A large number of those owning land (and including many pensioners) but having no intention of using it do not feel it is worth selling the land at the moment and are prepared to wait until they can get a higher price.

Even with the poor supply of agricultural land for sale, problems with registration and the lack of land consolidation, foreigners still would not have much chance of buying a larger proportion of agricultural land at today's depressed prices. A more significant rise in the value of land can only be expected when more movement begins on the market. However, that cannot occur unless the factors obstructing greater movement are removed.

It is true that the Hungarian land prices and land rents are much lower than the Western European prices and rents. However they are gradually growing, mainly near to the Austrian border (ERB 2004). The supports of the EU, especially in form of direct payments contributed to the rise of land prices. The foreign demand for land will not grow very much either at whatever prices after the restrictions are lifted since the demand for agricultural produce is low in Europe and the country lies on the periphery of the continent, far from the trade centers. The average land prices and land rents are very different even in the old EU countries. They depend on the total agricultural population/ land ratio, on the supply of and demand for land, and on the GDP/capita of the country, etc. An average EU price, which should be reached according to the negotiators for accession, as the criteria of lifting the restrictions with respect to the selling of land to foreigners, does not exist. Hungarian land prices will probably never reach the highest European level because the man/land ratio is relatively low and decreasing in Hungary, i. e. there is no land scarcity and very likely it will not be scarcity in the future (BURGER 2006).

4. 1. 2   Land prices and land rents observed

According to our survey, the rents are highest in Békés County in the Southern Plain, which

possesses the best land quality; next in the list is the county of Győr-Moson-Sopron, which is right beside the border of Austria (see Table 4).

Table 4: **Agricultural rents in the counties surveyed**

Counties	Average rents (thousand HUF/ha)	Average rents (approximately in EUR/ha)
Bács-Kiskun	20.5	82
Békés	28.7	115
Csongrád	9.5	38
Győr-Moson-Sopron	14.7	59
Vas	5.0	20
Zala	7.8	31

The highest average market price for agricultural land (according to results from the respondents) was in Győr-Moson-Sopron; this was followed by Bács-Kiskun and the other lowland counties (see Table 5). The highest price for arable land was also in Győr-Moson-Sopron, followed by Békés and then Vas County. The high market value and rent of land in Győr-Moson-Sopron county was not so much related to the superior quality of the agricultural land but for the most part, due to the greater level of industrialization and the livelier nature of the economy in general in that county.

Our survey indicated that most of the renting contracts (60% in the Southern Lowlands and 70% in western Transdanubia) were for 5 years. Contracts for shorter periods represented almost 25% of those in the Southern Plain and 10% in Western Transdanubia. The respective figures for contracts longer than 5 years were 15% and 20%.

Table 5: **Market prices of agricultural land in the counties surveyed**

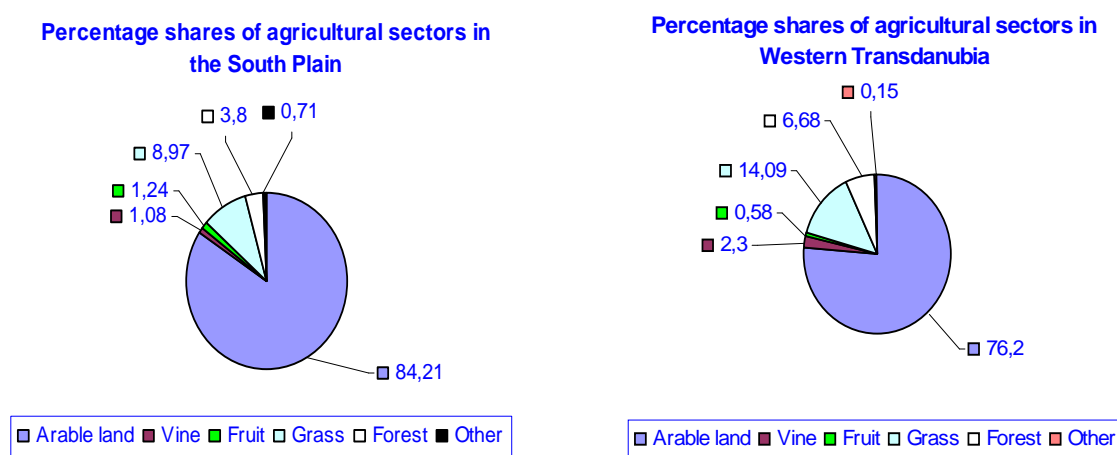| Counties	Average market prices of agricultural land (thousand HUF/ha)	Average market prices of agricultural land (approximately in EUR/ha)	Average market prices of arable land (thousand HUF/ha)	Average market prices of arable land (approximately in EUR/ha)
Bács Kiskun	220	880	207	828
Békés	190	760	172	688
Csongrád	180	720	148	592
Győr-Moson-Sopron	236	944	252	1008
Vas	82	328	163	652
Zala	127	508	114	456
All	**212**	**848**	**198**	**792**

5   LAND USE

The structure of the agricultural land used indicates that an overwhelming part is devoted to arable farming (approximately 80%) and it is cereals that represent the dominant crop. Vineyards and orchards account for a very small proportion of the land (about 2.5%) (see Figure 3). In the Southern Plain, Bács- Kiskun County followed by Csongrád County have figures which are slightly above the average for the latter types of land use. The average for the land given over to pasture is 12%, but in the counties of Vas and Zala – which, geographically, are in fact foothills of the Alps – the equivalent figures are 22% and 28% respectively. The average for the woodland area of individual farms is around 5%. The

equivalent figure for Zala County is approximately 9%.

Figure 3:

Percentage shares of agricultural sectors in the South Plain

☐ 3,8 ■ 0,71
☐ 8,97
■ 1,24
■ 1,08

■ 84,21

☐ Arable land ■ Vine ■ Fruit ☐ Grass ☐ Forest ■ Other

Percentage shares of agricultural sectors in Western Transdanubia

■ 0,15
☐ 6,68
☐ 14,09
■ 0,58
■ 2,3

■ 76,2

☐ Arable land ■ Vine ■ Fruit ☐ Grass ☐ Forest ■ Other

5. 1 Crop production

The respective figures for the proportion of arable land used for the production of cereals were: for both regions taken together 78%; Southern Plain – 72%; and Western Transdanubia – 84%. The rest of land was used for many different crops, especially (among others) for oil-seed crops in a comparatively high proportion. The proportion given over to vegetables was quite low when considered as an average. However, it was higher in the Southern Plain than in Western Transdanubia. In the Southern Plain the under cover production was also quite significant.

According to the EUROSTAT (2003) the cereal areas are lower in most EU countries than in Hungary. In 2001 the cereal area was 51 % of the total agricultural area of Hungary (of which wheat and maize were 20-20% respectively). At the same time, that of France (which possesses the largest agricultural area in Western Europe) was 32%. The average cereal area of the EU 15 was 28%. Among the new countries Poland has a large area devoted to cereals: at 51% it is the same as Hungary. All the other new and accessing countries have smaller proportions than this.

The production of cereals has continued to be large in Hungary despite regular overproduction. There are several reasons for this: old habits seem to be hard to give up; farmers are comparatively well-equipped for cereal production; it is labor extensive; costs are relatively low; many farmers lack information about the market; and the marketing of other crops is weak. After the privatization, for those absentee owners who acquired land in this process the simplest and cheapest option for cultivating it was the production of cereals by hiring machinery services. Accession to the EU has added to the incentives for cereal production, given that the EU provides significant subsidies for the land itself and for cereal crops. The result of all the above was an even greater level of overproduction; even so, farmers organized protests in order to get higher subsidies for grain which could not be sold. We think that greater diversification of crop production should be stimulated, propping it up with more thorough market information.

5.2 Yields

The yields for wheat and corn tend to be bigger on the larger farms (see Table 6). According to results provided by respondents in western Transdanubia wheat yields (4.2 tones/hectare)

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and corn yields (5.4 tones/hectare) are greater than in the Southern Plain (3 tones and 4.5 tones, respectively). The yields of farmers below the age of 40 were the largest and the survey indicated that results were also better in correlation with a higher level of education (see Figure 4).

Table 6: **Average yields in tones in the different farm-size categories**

Farm sizes (ha)	Wheat	Corn
1-5	3.30	4.45
5-10	3.90	4.85
10-20	3.49	4.87
20-50	3.73	5.13
50-100	4.10	5.85
Over 100	4.21	6.20
All	**3.69**	**5.00**

Figure 4:

Yields according to educational levels of farmers

■ Wheat □ Corn
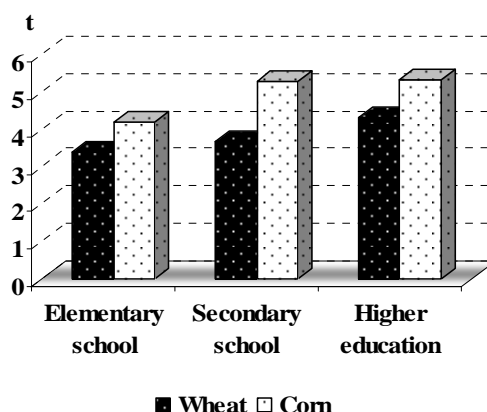
Products of organic farming account for only a small proportion of produce on farms surveyed: not more than 2.5 percent in average.

6   REGRESSION ANALYSIS OF PRODUCTIVITY

In our survey wheat and maize production provided a sufficient number of cases for carrying out a multivariate regression analysis. In this regression analysis yields reflected productivity. A number of potential regressors have been pointed out. A significant correlation was found between wheat yields and wheat area, total cultivated area, ages and education levels of farmers, number of workers per ha, and machinery per 100 ha. Dummy variables represented the main income source of farmers, types of farms (entrepreneurs, smallholders and family farmers), self-consumption or market production as main farming goals, and selling with contracts and without them. Obviously these variables were interrelated as well. We used an SPSS stepwise linear regression procedure which built up the model step by step, selecting from the variables offered in the order of their explanatory power.

In the case of wheat only three variables contributed significantly to the explanation of the variance of the yields (Table 7).

Table 7:   **Results of the regression analysis of wheat yields**

Variables	Regression coefficient	Standard error	Standardized coefficient
Constant	***2.693	0.240	
Educational level	***0.397	0.116	0.199
Selling by contract	*0.258	0.122	0.126
Total cultivated area	*0.002	0.001	0.119

*** 99.9%, * 95% levels of significance

[1] The regression of wheat yields was based on the data set of 284 farms. The explained share does not exceed 10% of the variability of wheat yields.

In spite of the relatively low explanation level of the model it is easy to interpret the coefficients. The results are in line with the expectations. One grade higher educational level means a nearly 0.4 t/ha increase in yield, the fact of selling by contract and the larger cultivated area have positive effects, as well. The standardized coefficients show the relative importance of the different variables. The educational levels of farmers have the strongest effects.

In the case of maize– with the same procedure – we could explain 5.7% of the yield variance (R=0.240). The regression of maize yields was based on the data set of 258 farms.

The yields of maize -similarly to the yields of wheat - are higher the larger the farms are, and higher the greater the educational level of the farmers is.

7 CLUSTER ANALYSIS

Based on the characteristics of labor, land use, animal husbandry and supply of machinery we can identify different clusters of farms. We characterized the farms by a set of their main features. Then different clusters were formed in accordance with the similarities of these features. Finally we compared the different clusters.

The main features which characterized the farms were the followings:

Labor: ages, educational levels (1-elementary school, 2- secondary school, 3- high school), number of workers on the farm, number of workers per ha.

Land: the total cultivated area (ha), the share of own land in the total area (%), the share of wheat area (%);

Livestock: heads of cattle and pigs, number of cattle and pigs per 100 ha;

Machinery: number of machinery per 100 ha, i. e. number of tractors, combine harvesters, and lorries.

Each farm was characterized by a vector and the elements of this were the standardized values of the above characteristics. They were standardized in order to avoid the influence of the magnitude of the different measures. The similarity of the farms/vectors was measured by Euclidean distance. 5 groups of the 573 farms were formed using an iteration procedure (SPSS K-means cluster i. e. quick cluster). One single farm with a huge pig stock formed group 2. Therefore we omitted cluster 2.

The characteristics of the resulting clusters are presented in Table 8.

The characteristics of the "Traditional" cluster 1 with 72 farms are the following: aged farmers with low educational levels, small land areas, highest number of workers, 1-2

machines, and no specialization.

The "Medium productivity" cluster 5 is the largest group. It is characterized by larger, but still small farms with younger but still relatively old but more educated farmers, a small number of workers, and low mechanization level.

103 farms form the "Efficient" cluster 4. They have large areas, young educated farmers, and highest number of machines. The number of workers and machinery per area are small; they are engaged in efficient crop farming.

The cluster 3, 56 farms of "Cattle breeders" has one common characteristic: cattle husbandry. The cattle stock is the highest in this cluster in absolute and relative measures.

Table 8:   Clustering characteristics of the formed clusters

Clustering characteristics	Cluster 1 Traditional farms	Cluster 3 Cattle breeder farms	Cluster 4 Efficient farms	Cluster 5 Farms of medium productivity
	N=72	N=56	N=103	N=341
Total number of adolescents working on the farms	4.3	3.1	3.4	2.5
Number of workers per ha	1.8	0.3	0.1	0.4
Ages of managers (year)	53.9	49.8	48.2	52.6
Educational levels of managers (1-elementary, 2-secondary, 3-high)	1.7	1.8	2.0	2.0
Total cultivated area (ha)	3.2	28.3	88.5	13.9
Shares of wheat area (%)	11.3	29.8	29.9	24.5
Cattle (heads)	0.1	19.5	2.0	0.4
Cattle per 100 ha	3.0	112.0	4.2	4.4
Pigs (head)	8.2	10.8	18.0	6.0
Pigs per 100 ha	326.7	77.2	53.0	70.0
Tractors, combine harvesters, lorries (pieces)	1.2	1.8	3.1	0.7
Pieces of tractors, combine harvesters, lorries per 100 ha	43.9	12.1	7.3	6.7

7.1 Profitability

The question which obviously arises is: which of the former characteristics have an effect on the profitability of farms?

Despite the lack of precise information the following variables were constructed to provide a rough estimation of profitability. Using the available data the profitable farms were marked with (+1), those which broke even with (0) and loss-makers with (-1). The level of profitability was calculated as a sum of the preceding 3 years' marks of the survey. The last 2002 year's mark was doubled. The tendency signifies the changes in the profitability during the start and end of the 3 years (see Table 9).

Table 9: **Characteristics of profitability of the formed clusters[1]**

Characteristics	Cluster 1 Traditional	Cluster 3 Cattle breeders	Cluster 4 Efficient	Cluster 5 Medium productivity
	N=72	N=56	N=103	N=341
Level of profitability (-4 to +4)	-0.6	0.5[*1]	1.2[*1,5]	0.3[*1]
Tendency of profitability	-0.2	-0.2	0.0	-0.2

[1]The figures in the cells represent the average values of the given characteristic of the given cluster. If it is significantly higher than the same characteristic of the other clusters it is marked with [*] and beside it with the numbers of the other clusters. For example, the level of profitability is significantly higher in cluster 4 than in the first and fifth clusters.

The profitability is significantly less than in any other group in the first cluster which represents small, non specialized farms and farmers with a low educational level. The fourth "efficient" cluster with young, educated farmers, and larger areas has significantly the highest profitability. However, the overall development of profitability is not encouraging: it decreases slightly in every cluster, except in the fourth one, where it seems to be stable.

8 CONCLUSIONS

Our survey showed that there is a firm tendency of concentration among individual Hungarian farms. Although their average size is about 3 ha, the number and area of farms over 50 ha in size are rapidly growing and now account for a significant part of the total individual agricultural area. The number of small farms is great but their total farming area is relatively small. Farms of over 50 and 100 hectares are the most efficient and they have the highest yields. The dominance of arable production and within that cereal production, especially on the larger individual farms, points to a prevalence of extensive farming. The present support and subsidy system fortifies this tendency. When comparing the Southern Plain with Western Transdanubia, it can be said that agricultural production is greater in the former region and more people are involved in agriculture. There is a higher share of under-cover production of vegetables and ornamental plants and animal husbandry. Nevertheless, Western Transdanubia's proximity to industrial and service centers and, furthermore, its closeness to Austria tend to suppress agricultural activities.

The survey also showed that farmers under 50 years of age and having a higher level of education than a primary one achieved better results than those over 50 and with a lower level of education.

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