

MICRO-REGIONAL CHANGES IN ANIMAL HUSBANDRY IN THE FIRST DECADE OF THE NEW MILLENNIUM

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Abstract: *Our study presents the spatial change in the number of pigs, cattle, horses, sheep, poultry of economically important animal species using mathematical-statistical methods. Primarily, we performed cluster analysis, correlation analysis and analysis of variance at the level of districts. The results were also visually illustrated using a map. We were looking for answers on how the number of these animal species important for agriculture changed from 2000 to 2010 per agricultural area (ha). After re-evaluating the changes in the 5 variables after 10 years using the same methods, we tried to draw conclusions focusing on the major differences between the two periods.*

Key words: *animal husbandry, Hungary, districts, changes between 2000-2010*

INTRODUCTION

In the course of my research, the delimitation was performed at the level of districts (174 pieces), with the help of the 5 observation variables already mentioned (poultry, sheep, horse, pig, cattle). The changes that took place after 10 years were evaluated again. I compared the results and looked for an explanation for the direction and extent of the changes. For poultry, only aggregated data (goose, duck, turkey, hen) were available.

I was curious about the number of these species present at the district level, per territorial unit (hectare) and I drew conclusions from the results evaluated using the examined methods and made suggestions to improve the situation of animal husbandry.

In historical retrospect, it can be said that at the time of the change of regime (end of the 1980s) the decline of agriculture, and within that of both crop production and animal husbandry, was already visible and felt. Of course, the rapid and profound changes that took place in the economy, society and politics contributed to this fact, for which the productive farmers and farms were not prepared just like the other actors of the population. Our export markets declined rapidly, which resulted in a decline in production volume, and this was felt by animal husbandry in Hungary as one of the best sectors. See: State aid for cow cuts, mass eradication of pig fattening on backyard farms [3,13].

Not to mention the lack of capital and disorganization that characterized the situation of domestic agriculture during this period. Together, droughts and market effects have pushed up feed prices, leading to a drastic drop in consumption. The economies that survived had to develop, which the less capital-intensive economies could only remedy by borrowing, which in many cases resulted in the continued insecurity of forced enterprises [1,2,5,4,7,8,10,14,].

My research was limited to the following questions:

- Can territoriality be observed in our domestic animal husbandry?
- Can we identify areas of similar composition in the country?
- If so, where are these areas located at the district level?
- What changes characterize the territorial development of animal husbandry?

MATERIALS AND METHODS

The choice of the ideal date of the census (March 31, 2000) was optimal because by that time the land use conditions had developed, based on the spring composition of the livestock, it was possible to conclude the development of the annual livestock, but the data

also served as a basis for subsequent representative censuses. In Hungary, a full-scale agricultural census (General Agricultural Census, GAC) must be carried out with an ideal date of 1 June 2010; took place between [9, 15].

Methods:

- The correlation coefficient emphatically measures the strength of the linear relationship between the studied characteristics. Their values can be misleading in the case of a nonlinear relationship. If the correlation between two characteristics is low, it does not mean that there is no relationship between them, only that there is no linear relationship.
- Cluster analysis is actually a dimension reduction process. The variables assigned to the observation units represent the original dimensions along which we want to group the observed ones in such a way that those belonging to one group are close to each other along each variable and away from each other group, cluster. It follows from the definition that the key concept in cluster analysis is distance.
- Analysis of variance is one of the explanatory models, the essence of which is to analyze the effect of one or more independent variables on one or more dependent variables. Analysis of variance is most commonly used to examine the relationships between the means of the populations involved in the analysis. The values of the eta square show the effect of animal species on territorial inequalities [6,11,12].

RESEARCH RESULTS

For our study, we used the data series of the GAC in 2000 and 2010 during the data collection, We calculated how many animals per species per agricultural area. This is how the 8 clusters were created after running the program. I examined these clusters for the years 2000 and 2010 and illustrated the change with the help of a map, where the statistical characteristics broken down by districts can be clearly seen on the basis of a color scheme, and then the obtained results were evaluated.

Correlation analysis did not show particularly strong relationships for the 5 animal species. The calculation revealed weak and weak-medium strength relationships between positive pigs and poultry in 2000 (0.345), positive in horses and sheep (0.461), pigs and cattle (0.216), but sheep and between cattle a weak (-0.194) but opposite significant relationship. In contrast, in 2010, a smaller number of significant associations could be detected for these animals.

In 2000, the largest differentiating factor for animal species was poultry, followed by sheep, followed by horses, pigs and cattle. In 2010, there was a change in the order of horses, pigs, poultry, sheep and finally cattle in the differentiating factors in descending order.

As a result of the analysis, the districts were classified into 8 clusters and they form homogeneous groups based on the spatial distribution of animal species. In cluster analysis, we aim to bring the most matching elements into a group. The aim of the analysis is to arrange 174 observation units (excluding the capital) in a relatively homogeneous group based on the variables included in the analysis, in this case the 5 agriculturally important / cattle, pig, poultry, sheep, horse / animal species.

We calculated how many animals per species per agricultural area. This is how the 8 clusters were created after running the program. We examined these clusters for the years 2000 and 2010 and also illustrated the change with the help of a map, where the statistical characteristics broken down by districts can be clearly seen on the basis of a color scheme, and then the obtained results were evaluated.

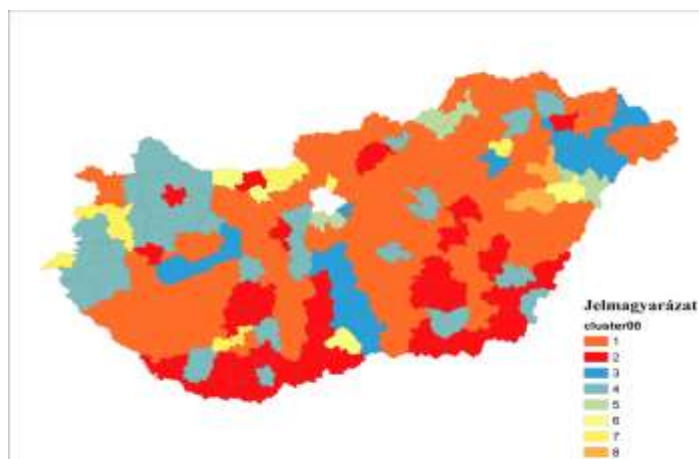


Figure 1. The spatial distribution of the clusters based on animal husbandry features (2000)

Source: own editing

Cluster 1: 82 elements, i.e., a circle made up of orange. The cluster can be said to have below-average values coming out everywhere. The largest difference (-0.439) can be detected in the case of pigs, so the number of pigs is typical of the Transdanubian hills and the majority of the Great Plain. **Cluster 2:** There are 29 items here in red on the map. The number of pigs in this cluster is above average. These are mainly the South Transdanubia districts and the South Great Plain districts. This cluster is blue. **Cluster 3:** The 14 round trips are mostly located in the Nyírség, Dunamenti Great Plain and Balaton Uplands areas. Sheep are present here above average of 2.34. Cattle represent the highest (-0.90) below average of the other animal species. **Cluster 4:** consists of 29 elements and these districts are typically located in the Transdanubian parts. Here, the number of cattle is above average, with a value of 1.44. The other variables are present in below-average numbers, with sheep also deviating best from the average in a negative direction. **Cluster 5:** The number of horses here is well above average. A value of 3.58 indicates the presence of the State Stud Farm. (Szilvásvárad) and the number of sheep is still above average. **Cluster 6:** The higher presence of abraze animals (pigs 3.12 and poultry 3.94) is indicated in these districts of Debrecen, Jánoshalma, Komárom and Tatabánya. the results, but here the number of sheep is less than the average. **Cluster 7:** The number of poultry is higher in these yellow areas (Western Transdanubia, South and North Transdanubia) with its value of 2.57. Other animal species have below average values. **Cluster 8:** The districts of Hajdúböszörmény and Hajdúszoboszló belong here, where the number of pigs (3.17), cattle (2.87) and sheep (1.75) is above average, but the group is heterogeneous except for cattle.

The results of the 2010 year cluster analysis shows a different spatial structure of animal husbandry, too. **Cluster 1:** 39 districts belong here marked in blue. Here, the number of cattle alone, which is above average (1,335), we obtained below average values for the other animal species.

Cluster 2: There are 67 elements here, with below-average values for all 5 animal species. These districts are shown in light blue on the map.

Cluster 3: there are 14 districts in it and practically 1 in the case of the pig we find above average numbers, these districts are pale green on the map. These are the Northern and Southern Great Plain, the Northern and Southern Transdanubia.

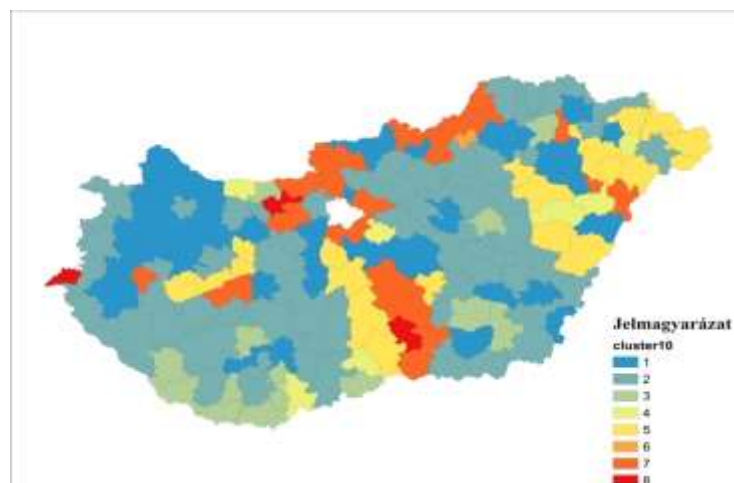


Figure 2. The spatial distribution of the clusters based on animal husbandry features (2010)

Source: own editing

Cluster 4: Only 4 districts can be classified here, with the above-average values of pigs (3.56) and poultry (1.48) these are the greenish-yellow districts (Hajdúság and Nyírség districts and Monori, Komárom, Jánoshalma, Mohács districts).

Cluster 5: 20 rounds and is characterized by an above-average number of sheep in these districts. These are the Hajdúság, Nyírség, Bereg and Kiskunság and Balaton Uplands.

Cluster 6: Bélapátfalvai belongs here as the only district. The 8.51 value for horses is outstandingly above average.

Cluster 7: A darker yellow color indicates these districts on the map. In the 23 runs, the horses are above average (1,376). Sheep can be characterized by an average number of individuals, pigs, poultry and cattle with an average number of individuals.

Cluster 8: Red indicates these 3 districts on the map. The districts of Szentgotthárd, Kiskunmajsa and Tatabánya are indicated by the outstanding proportion of poultry of 5.68, which is also homogeneous.

CONCLUSIONS

Comparing the years 2000 and 2010, it can be said that the territorial peculiarities of domestic animal husbandry remained basically at the level of districts as well. In 2000, the decline in the number of pigs was most visible in practically a significant part of the country, mostly in the Great Plain and Southern Transdanubia districts, where, in principle, all conditions were in place before for animal husbandry and crop production produced good results. Here, in my opinion, the drastic decline in individual farms can be explained by the declining number of animals, and this was not significantly changed by the 2010 analysis, and even a further decline was detected in the case of pigs and cattle. The decline in cattle farming is declining in North Transdanubia, the Northern Great Plain and, sporadically, in many districts where the keeping of these animals and milk production were previously significant. The number of cattle has been steadily declining, fueled by a chain-like wave of dairy closures or a decline in production that began in the early 2000s. In sheep, headcount changes were not as drastic. By 2010, there was a slight increase in the areas of Kiskunság and the Northern Great Plain, where pasture-based farming has a long tradition. The increase in poultry farming compared to 2000 is due to the re-emergence of backyard farming and the jump in the number of ducks (for example, Kiskunmajsa

district), where a high-quality slaughterhouse started operating. Our horse breeding also contains several fluctuations within a decade, which is strongly influenced by fashion and hobby riding, but it can be said that their number is declining slightly, year by year, which, in my opinion, is aided by a high degree of motorization. By delimiting the main livestock hubs, it can be suggested that the establishment of a region-specific processing industry, broken down by animal species, would solve the problem of local employment to some extent, which would also contribute to the development of agriculture. Retaining a rural workforce would also improve the competitiveness of agriculture. The establishment of processing plants to be built near product production plants would also help the catching-up of the countryside, thus reducing the emigration of young people in lagging areas, as well as the rural-urban gap, which is one of the key tasks of rural development strategies.

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