

Typing of the Homokhát settlements with factor- and cluster analysis

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Abstract

With the passing of time, it is sometimes necessary and useful to re-examine classic themes and territories. In my view, such a theme is the restructuring of rural economy, and such a territory is Homokhátság. Unfortunately, the territory under investigation mostly only receives attention during summer droughts, when the lack of water is so severe, that farm fields, or even gardens, may not be watered. The explored economic and social processes are most certainly also affected by the lack of water, but unravelling the relationship between these two processes is not the subject of this writing. My goal is to shed light on those phenomena, in which the restructuring of the rural economy is manifested. It may well be that we do not obtain an epoch-marking result, or one which is surprising, but I consider it important to keep our fingers on the wrist of Homokhátság and to check its pulse. In my opinion it is also important we do, because it true for regional science statement of Herakleitosz, what is; the only constant is change.

Keywords: rural economy, Homokhátság, restructuring

JEL (SME Jel): R11, R51

A Homokhát településeinek tipizálása faktor- és klaszteranalízissel

Összefoglalás

Az idő múlásával olykor szükséges és hasznos klasszikus témákat és területeket újra és újra megvizsgálni. Ilyen téma meglátásom szerint a vidékgazdaság átstrukturálódása, valamint ilyen terület a Homokhátság. Sajnos a vizsgált terület leginkább csak a nyári aszályok során kap figyelmet, amikor a vízhiány olyan súlyos, hogy már öntözni sem lehet a termőföldeken, illetve a kertekben. A feltárt gazdasági és társadalmi folyamatokra minden bizonnyal a vízhiány is hatással van, de e két folyamat közötti kapcsolat feltárása nem témája ezen írásnak. A céloom rávilágítani azokra a jelenségekre, amelyekben a vidékgazdaság átstrukturálódása manifesztálódik. Meglehet, hogy nem kapunk korszakalkotó eredményt, vagy olyan eredményt, amelytől meglepődiünk, viszont fontosnak tartom a kezünket a Homokhátság csuklóján tartani és figyelni a pulzusát. Véleményem szerint fontos ezt azért is tennünk, mert a regionális tudományra is igaz Herakleitosz azon állítás, mely szerint az egyetlen állandó a változás maga.

Kulcsszavak: vidékgazdaság, Homokhátság, átstrukturálódás

JEL (SME Jel): R11, R51

Introduction

The process of globalisation influences every area of life, the denouement of which is often positive, but at times it is disadvantageous, for instance for rural territories and communities. It is

important to note, that besides economic processes, the progress of globalisation is also felt on the level of “intellect, consciousness and civilisation.” (Bálint-Juhász, 2009: 9) These processes impinge on the local rural economy from outside, meaning they are not embedded. In most cases, elements found in the location must accommodate to these. With regard to the fact that rural economies are varied by reason of their resources of differing quantity and quality, the effects are also manifested in different ways. This has resulted in the responses given to globalisation or to political decisions also being different, and having to be different in the provincial settlements and areas.

In the article, I wish to illustrate what processes have occurred in Homokhátság of the Danube-Tisza Interfluvium over the period since the change of political regime. Examination of the processes is aided by characterising the settlements, which provides an answer as to which settlements follow a similar path.

Thanks to the growth period which took place over the past decades, “the scale of needs has been transformed, demands have changed, numerous new consumer elements have emerged, which appear as natural requirements with the spread of the concept and institutions of the welfare state”. (Káposzta, 2015: 13) Effects of the globalisation cause economic and social recession on the rural areas. Numerous signs of decline have appeared: spaces and educational institutions serving the communities have shut down, the transport infrastructure has deteriorated, social helplessness and the employment situation have become increasingly severe. (Káposzta, 2015) According to Magda and her co-authors, the reason for these processes is that rural economies are vulnerable, and supporting them is the duty of the current state. The subsidies (financial, knowledge transfer, etc.) are needed not only for staying alive, but also so that even Hungarian rural economies can enter into competition with global economic players. A pivotal part of these subsidies is the sensible usage of current European Union co-financing programmes, which can increase the competitiveness and efficiency of the region.

According to Ritter, besides the appreciation of regional policy, the spatial structure of the European economy has also been realigned in the wake of globalisation, that is, that local areas appreciate, the development of which is not only the duty of current governments, but also that of the settlements. According to Ritter, by reason of restructuring, the concept of rurality is also reinforced, transformed, it fulfils a new role, with which for some time the concept “has expressed a totally new social and economic dimension”. (Ritter, 2018: 408)

The significant change in world food production and food consumption has also had a great effect on the countryside, because new technologies, plant and animal species have appeared, which previously were not even known. Genetically modified plants and animals, hydrocultural plant production, GPS based arable land crop growth all serve the operation of a more economical and thus more profitable agrobusiness. Pressure from consumers, on the other hand, is the demand for healthy, marketable fruit and vegetables, free of chemicals if possible. Achieving the goals described requires considerable financial liquidity from both parties, which also has a significant sifting effect. In consequence of globalisation, society no longer demands only food production from the agrarian community, but pointing beyond this, requires it to take on responsibilities which have never arisen before. Responsibilities thus undertaken include “for the natural and social environment, for equal opportunities, for lifelong learning, for employment and for the development of provincial areas” (Bálint-Juhász, 2009: 9), which are already helping to solve and mitigate major, global problems. Global problems such as these include climate change, lack of water, poverty, migration and deforestation. (Bálint et al, 2009)

For more than the last decade, in my opinion the phenomena of globalisation have also included the spread of activities mitigating the effects of climate change, which alongside the many globalisation phenomena negatively impacting countryside areas is a positive sign. The spread of various

invasive plants and animals is considered a globalisation phenomenon, which have entered by means of people and goods coming to our country from far-off foreign countries, and are causing problems. One of these plants is ragweed, which was unknown here until the first quarter of the 20th century. In the second place, various ecological corridors have aided the spread of foreign creatures. Such ecological corridors are, for instance, a railway line or a river valley. These plants and animals cause problems primarily in the natural environment, furthermore in tourism, then indirectly in the everyday lives of local people. (Bálint et al, 2009)

In the same way that the urban lifestyle is not gaining ground everywhere, or where it is then not to the same extent, the decline of countryside areas is not uniform either. A distinction must be made between at least two types of settlement groups: between the periphery and the central, but mostly the settlements located in Budapest suburbia. With the settlements in the periphery, decline and the lack of urban lifestyle are more apparent, in contrast to suburbia. As a result of this, town residents appear in the latter settlements and with them the processes of quantitative and qualitative urbanisation, where conflicts of interests often arise between those moving out there and the natives. Suburbanization and de-urbanisation are not only perceptible in the rise in the number of residents, but also in the increase in services and the change in the townscape. Available services change not only in quantity, but also in terms of quality due to demand and higher paying capacity. Shaping of the townscape, on the other hand, often becomes more colourful with alien edifices. Construction industry contractors satisfying the demands of the crowds moving out of the city establish enclosed residential condominiums built very close to one another, paying no heed to the architectural culture or tradition of the given landscape unit or area. Besides the residential communities, distinctively renovated peasant houses have also appeared, chiefly in peripheral areas. There are numerous reasons for people moving out, including the appeal of the rural idyll, and the promise of the provision of living conditions. A significant number of those leaving their city residences belong to the middle class, trusting in a peaceful place to live. Moving out entices people with prestige and an increase in status, who belong most to the more highly qualified, younger segment of society. (Rechnitzer et al, 2011; Kovách, 2012)

Though it is important to take into account that globalisation has not raised its head in the last thirty years, but it had its phenomena and processes much earlier, but then it was still called conquest. For instance, there was the conquest of South America in the 1500s referred to by Bálint and Juhász. Cortez and Pizzaro wanted to go to the New World on “financial matters”, but instead they launched processes in the Aztec and Inca empires which significantly altered the lives of those living there, indeed, directly and indirectly they wiped out tens of thousands, in fact millions of people. (Bálint et al, 2009)

The change in the rural economy in our country did not begin with the change of regime either, but well before it, approximately from the mid-19th century, when the development of the railway network began, among other things. In the countryside, the railway provided settlements with a huge development potential for getting grown products and the population to more distant markets more rapidly, thus promoting economic and social development. Later on, according to what László Kulcsár wrote, between the two world wars, “the traditional close ties of the triad of village, peasantry and agriculture... set out on the path of powerful disintegration” (Kulcsár, 2017: 93). In state socialism, collectivisation took place between 1948 and 1953, during which in the majority of rural settlements around four million acres of land were reallocated. As a result of this and constrained industrialisation, the countryside began to be depopulated, the population headed for the cities in order to find a new living space and livelihood. Also due to this enforced increase in demand blocks of flats began to be built, the very first of these being occupied on 2 January 1960 in, as previously known, Sztálinváros (now: Dunaújváros). In the 1970s, those born in the Ratkó

era also generated a demand for their own homes, so the then system needed to satisfy their requirements too. The farmers' cooperatives and state farms did provide work for a lot of people, but the farming carried out on hundreds of hectares and the establishment and technological development of huge animal rearing estates also meant the replacement of the live labour-force, which then streamed from the villages and hamlets towards the industrial facilities. In consequence of this, the proportion of active agricultural earners and the share of the agrarian branch in the GDP fell drastically and industry became dominant in larger and smaller provincial towns. And considered locally, this entailed a total transformation of land usage and the structure of agriculture, as a result of which, in smaller towns, and even in villages, agriculture did not become the primary source of livelihood.

Unfortunately, the change of regime did not have a positive effect on agriculture, and beyond it on the countryside. Unemployment in the countryside became a good deal higher than in the cities. An example of this is small villages, in which case the loss of jobs was much higher at 34% than the national average of 18%. This is in part due to the higher than average unemployment among the commuting, provincial and unqualified labour force. Provincial poverty, as well as the emergence of poor zones is most attributable to this. With regard to agriculture, the year 1993 was the worst, as compared with the period preceding the change of regime scarcely more than the half could be produced, and inflation was also around 20-30%. Ten percent of arable land remained uncultivated, agrarian employment fell to close to one third between 1988 and 1997. In the second half of the nineties, however, concentration of estate and agricultural production began. This concentration has since been continuous, as whereas there were 966 working family farms in 2000, in 2016 there were only 365 thousand. The explanation for this, is that the smaller farms with land of less than 100 hectares in area were unable to make a profit.

Thanks to the European Union agricultural policy, by means of subsidies the land usage structure stabilised after 2010, but migration from countryside settlements, as well as their ageing still continues. (Kovách et al, 2018; Kovách, 2012)

According to Péter Póla's view, globalisation also has an equalising effect on regions, or the underdeveloped areas are also target regions for the flow of capital, so they are thus able to link in with the circulation of world economy. Following the change of regime, the economic flourishing of Western Hungary is the best example. Alongside this, however, there remains the rule, according to which the capital migrates to the place where it has the best time. The main transport corridors, the town, the centres have become even more appealing, and thus the regional inequalities may be further sharpened.

The purpose of my study is to sort into types the settlements of the Homokhátság based on the restructuring of the rural economy. I examined these settlements since the regime change. With the help of typification, we get a more transparent picture about the region, which can even form the basis of a document for the development of the region. The necessity of the development document is more and more increase due to desertification and the resulting negative processes. This is supported by the fact that in 2023 the Regional Development Concept and Program of the Homokhátság between the Danube and Tisza will be completed on behalf of the county government by the Kecskemét Research Group of the Regional Research Institute of the Economic and Regional Science Research Center.

Materials and methods

The area under investigation is given by the Homokhátság delimitation produced by Bálint Csátári, Ferenc Glatz and András Donát Kovács in 2004, which is located on an area of close to 10 000 km². The Homokhátság defined by them embraces 104 settlements in the Danube-Tisza Interfluvium (figure 1), divided between three counties: Bács-Kiskun: 61 settlements, Csongrád: 22 settlements, Pest: 21 settlements.

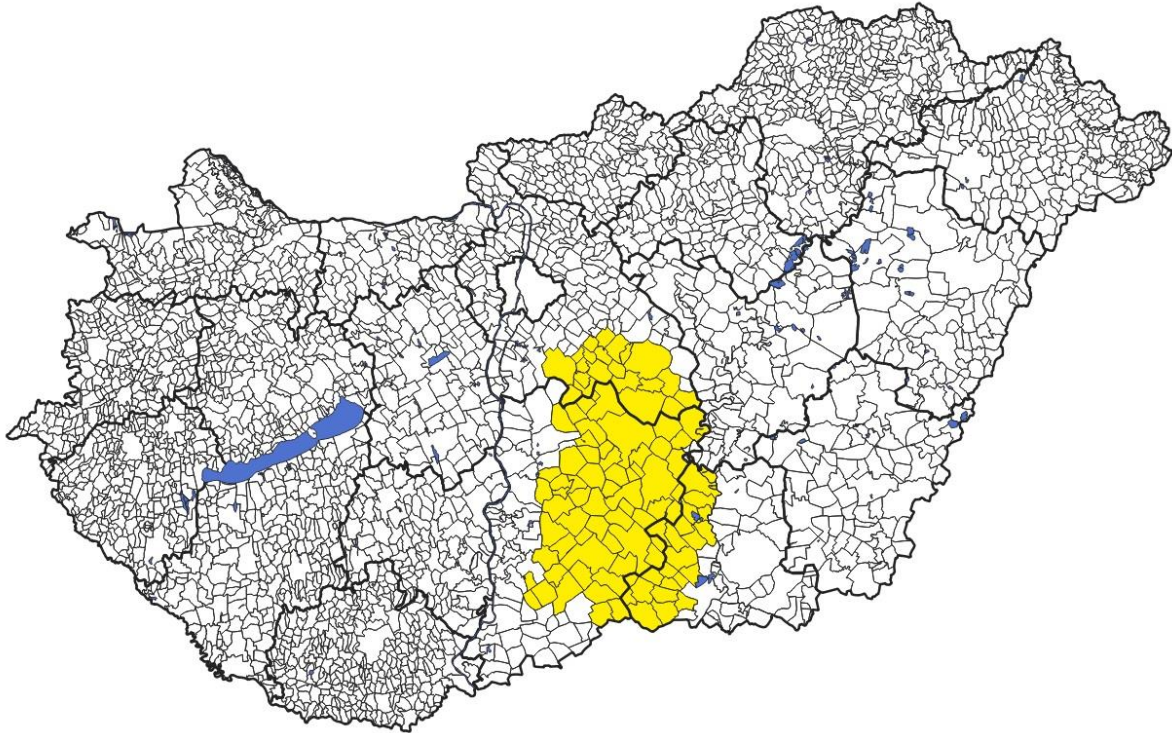


Figure 1: Settlements of the Homokhátság

Source: Glatz et al., 2004

The territory under investigation has been delimited by several people in several ways, but each delimitation agreed in that the Homokhátság lies between the Danube and the Tisza and the largest part of the area is in Bács-Kiskun County, and its smaller sections to differing extents reach over into the territories of Csongrád-Csanád and Pest Counties. In fact, there is one delimitation, according to which the southern part of the Homokhátság extends into the territory of Serbia too. In this sense, this region is not only indefinable in terms of public administration, it is not even featured in the methodological listing of the natural landscapes of Hungary, thus making it a special landscape category. Its surface is basically steppe, the height of which above sea level is 80-140 metres, and thanks to climate change and human landscape transforming work, it is now a semi-desert landscape. During climate change, Homokhátság is one of the most sensitive and most affected areas of the country, with respect to which “the UN world food organisation, the FAO, in its long-term forecast has declared the Danube-Tisza Interfluvium to be a semi-desert zone, indeed, the most pessimistic analyses project the danger of it becoming a dessert.”(Glatz et al, 2004, Ferencz et al, 2019)

„Homokhátság is at one time a natural formation and a cultural landscape transformed by man, as a decisive role in the formation of its present image has been played by history and by the population living here.” (Glatz et al, 2004)

The indicators used for the analyses come from the National Regional Development and Regional Planning Information System (TEIR). The data gathering was set back by a change in the methodology of the indicators, furthermore, that a piece of data was not featured for the given settlement, so I was compelled to ignore it, as it was there as a salient value, which would have impaired the analysis result. The data for the subsidies were obtained from the Database function of the Integrated Administration and Control System (IIR), furthermore from the Széchenyi Plan Plus Mapping services, up till the deadline of 31 January 2023. The subsidies include the following schemes (K: Contracted sum, SZ: Paid out sum): National Development Plan (2004-2006) (NFT) (SZ), New Hungary Development Plan (2007-2013) (ÚMFT), (K), Széchenyi 2020 (2014-2020) (K), Széchenyi Plan Plus (2021-2027) (SZ), Brexit damage mitigation scheme (2021-2022) (SZ), Restoration and Resistance Plan (2022-) (RRF) (SZ).

Besides these, I had to further screen my indicators for the factor and then the cluster analysis to be carried out in the SPSS due to the sensitivity of the analysis methods. Furthermore, I wanted to select indicators that have significant multiplier effects. Therefore, I needed to reduce the uploaded 37 indicators to 8. Because of I considered important to use indicators with significantly different periods too. In this way, I got as far as having my work cover 33 years. On the other hand, one settlement is an exception to this, which is Móricgát located between Bugac and Jászszentlászló. The settlement only became independent following the change of regime, seceding from the village of Jászszentlászló on 1 June 1993. For this reason, the population density was not featured in 1990, I could only utilise the data from 1994. I consider important to use the indicators which have significantly different period, because in my opinion multiplier effects of these are important in the rural economy. The indicators are displayed in table 4 of the Results section, together with an indication of the period covered by them.

Results

Factor analysis

The results of the factor analysis performed are contained in table 1, according to which three factors were formed from the 8 indicators entered into the SPSS and appropriate to the investigation. The KMO value is 0.620, so the result of the investigation performed may be listed in a medium category. The significance is 0, which means that the indicators affect one another. The final indicator is the explained variation, which in the present case is 65,10% This means that a significant proportion of the information borne by the indicators during the investigation could be retained. According to Csallner this value is acceptable, as in the field of the social sciences the lower limit is 60%.

Table 1: Applicability of the factoranalysis main indicators

Number of main components	KMO criterion	Sig.	Explained variation %
3	.620	.000	65.10

Source: Own editing, 2023

With the aid of the factor analysis, three factors emerged from the eight indicators, the factor contents of which and the names given to the factors by me are contained in table 2. While carrying

out the factor analysis, I also had to pay attention to the criterion, according to which the sample size, in the present case the number of settlements, must be at least ten times greater than the number of indicators.

Table 2: Factors of settlements of the Homokhátság

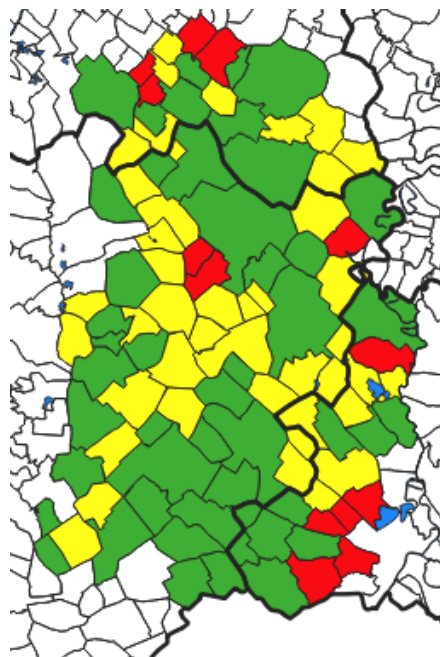
Indicators	Factor content of indicators	Name of factor
trend of PIT payers per 100 persons 1992 - 2020	.787	employment
change of proportion of young people 1990 - 2021	.658	
change in net income per person 2004 - 2020	.814	
population density trend 1990 - 2022	.778	society
trend of proportion of those with university or college qualification 1990 - 2011	.850	
natural increase, decrease (thousandths) 2021	.537	
operating enterprises per one hundred persons 1996 -2020	.771	economy
European Union subsidies per person 2004 -2023	.773	

Source: Own editing, 2023

I have named the factors in accordance with which indicators the analysis assigned together. I thus considered it logical to name the first factor employment, the second factor society and the third economy.

Cluster analysis

As a result of the cluster analysis, three settlement groups have been defined, which are illustrated on figure 2: the number of settlements marked in green is 48 (cluster 1), the number marked in yellow is 43 (cluster 2), and the number in burgundy is 13 (cluster 3).



2. Figure: Settlement types of the Homokhátság

Source: Own editing, 2023

Before presenting the clusters, I consider it important to emphasise that the cluster level averages of the indicators for the Natural increase and decrease of the year 2021 and the Trend in the proportion of young people between 1990 and 2021 have a negative sign with respect to every cluster, so the settlement types are characterised by a natural decrease and a fall in the proportion of young people. Irrespective of this, however, there are some settlements for which these indicators have a positive sign.

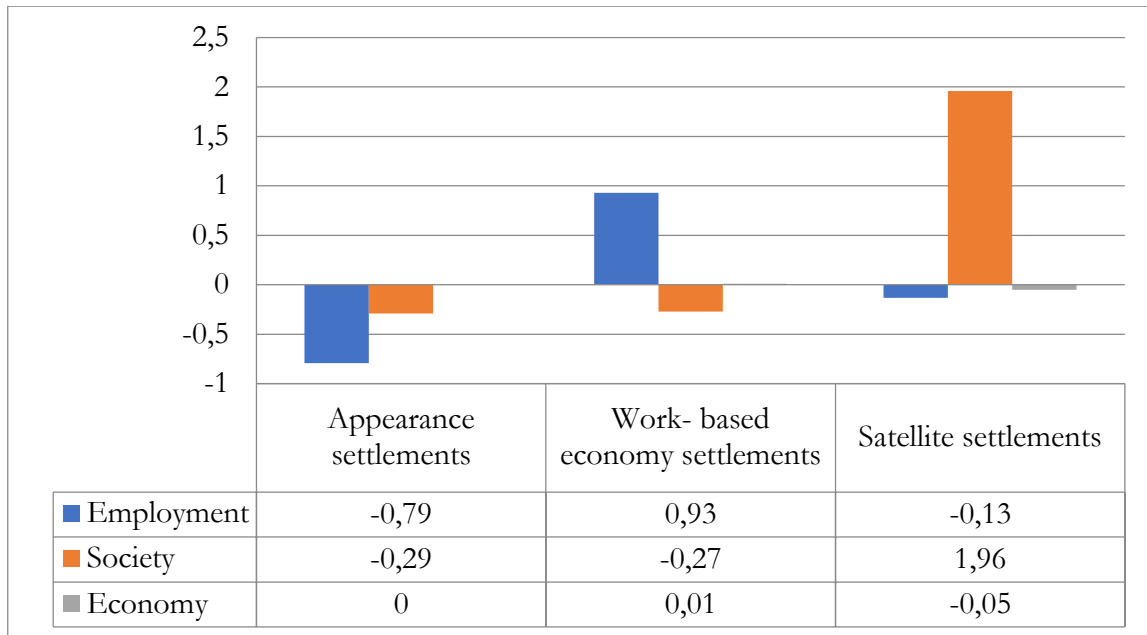
The appearance settlements belong to cluster 1, which I have marked in green on the map. Among them are some very surprising settlements (e.g. Kecskemét, Kiskunfélegyháza, Kiskunhalas, Kiskunmajsa, Kiskőrös, Tiszakécske, etc.), for which the economy factor and the net income indicator do show prominent values, but the trend in the number of PIT payers, the trend in population density, the natural decrease and the proportion of young people suggest an outstandingly negative tendency. Of the three established clusters, this group has the second highest proportion of settlements with the rank of town. This proportion is 35,4%, meaning 17 settlements of the 48 are concerned. The settlements in the cluster are also under-represented with respect to the average of several indicators: the population density, the natural decrease, as well as the great fall in the proportion of young people, and also the average net income all fall short of the settlements in the other two clusters. The two major reasons for the prominently large shortfall in the population density are that in these settlements, not only natural decrease is characteristic, but also a high degree of migration. According to the inland migration data for the year 2021, the migration data are very unfavourable, not only from smaller settlements, but also from major ones. Settlements like this include Kecskemét, Kiskunfélegyháza, Kiskunhalas and Kiskunmajsa. The target settlements for the suburbanisation and de-urbanisation caused by the migration are for the most part the satellite settlements lying around the large cities, this being confirmed by the increasing population density of these settlements. Besides the satellite settlements, the settlements lying close to the junction of the M5 motorway are also appealing. On the map, the settlements of the cluster trace out three groupings. The first lies in the north part of Bács-Kiskun County and the south of Pest County. Around half of these settlements are of town rank, in fact, Kecskemét also fulfils the function of County Town. The second grouping lies in a north-south direction and is positioned Izsák – Kiskőrös – Kecel. The third is the area lying to the south of the towns of Kiskunhalas and Kiskunmajsa, also stretching over into Csongrád-Csanád County. With regard to the fact that the economy factor performs the best, it is important to add, that these advantages are very minimal (1,2% on average), whereas the shortfalls are considerable compared with the other clusters (3,0% on average). The fall in the population density of Kecskemét is significant, but not outstanding. This indicator for the County Town reaches 5,9%, whereas the average for the settlements in the cluster shows a rise of 2,11%. There are two reasons for the fall in the population density happening in this way, one of which is the suburbanisation process, and the other is the growth in the area of the town by around 23,45 km². This growth in area happened by reason of building the Daimler AG plant in Kecskemét, as the County Town took over territory from the neighbouring settlement of Városföld. With regard to the trend in PIT payers, and also with respect to the trend in the proportion of young people, the County Town shows an outstandingly unfavourable picture. On the other hand, the largest settlement in Homokhátság has received an outstanding amount of support over close to the last two decades, the natural decrease falls short of the average, and it has performed better with respect to the trend in operating enterprises per 100 persons, those with advanced qualifications, and the 2020 average net income.

I have given the name work-based economy settlements to the settlements which belong to cluster 2, as the employment factor shows a visibly more favourable picture than the settlements

in the other clusters, and the economy factor took on an average value, this being zero. With respect to the settlements marked yellow on the map, they have the highest growth in the proportion of PIT payers per 100 persons compared with the other two clusters. Besides this, the proportion of young people and the natural decrease fell the least in this cluster. The settlements in the cluster only performed the worst in one area, with respect to the proportion of residents with advanced qualifications, as the growth was 3,71%. On the other hand, the value of the indicator cannot even be regarded as very bad compared with the other clusters, as the best average value for the settlements of cluster 3 is 3,79%. Of the 43 settlements in the group, only three have the rank of town, which signifies 7%, this being the lowest in the three defined settlement groups. Their placements on the map are very scattered, the majority being further from the County Towns, but they lie closer to medium-sized and large towns. They are not really touched upon by major railway or road transport routes, merely the electrified railway line number 150 passes through a significant proportion of the settlements.

I have given the name satellite settlements to the third cluster, to which they correspond both in terms of their positioning on the map and according to their indicators and characteristics. On the map, every settlement is located around a large town, with only Felgyő being an exception to this. Csongrád lies closest to the village at 6 km away, the next closest town being Szentes at 13 km. Due to this privileged situation, it behaves differently from the other settlements belonging to the cluster, as only the population density of Felgyő is falling. Whilst the population density of the other settlements grew by 37,2% on average, that of Felgyő fell by 2,9%. The other indicators of the settlement can be said to be average, but the subsidies indicator is much higher with respect to the other settlements in the cluster. With regard to the cluster as a whole, the population density and the proportion of those with diplomas expanded to an outstandingly greater extent, furthermore annual net incomes for the year 2020 are somewhat higher, with respect to the settlements of the other two clusters. With regard to the trend in the number of PIT payers per 100 persons, the sum of the subsidies per capita, as well as the number of operating enterprises per 100 persons, it fell short of the other clusters, but this shortfall is not so large. It is characteristic of the satellite settlements that the natural increase and decrease indicator is more favourable, it shows a positive tendency compared with the other settlements. This is not realised in the present case, however, but the indicator only falls short by 0,5 percent of the best indicator of cluster 2; work-based economy settlements: -0,690%, satellite settlements cluster: -0,695%. The trend in the proportion of young people, in contrast, lies much closer to the -9,09% of the worst appearance settlements cluster. This value is -8,99% for the satellite settlements cluster, whilst the work-based economy settlements have the most favourable value, at -8,71%. Of the 13 settlements of the satellite settlements cluster, 4 lie within greater Budapest, and furthermore the proportion of towns is more than 46%.

Following the investigation, it can be determined of the imaginary ranking of the settlement groups, that the satellite settlements occupy the first position, which are followed by the group of Work-based economy settlements. The list is closed by cluster 1, the appearance settlements, with respect to which not one indicator performs favourably.



3. Figure: Direction of restructuring of the clusters

Source: Own editing, 2023

Conclusions and recommendations

Arrangement of the settlements of Homokhát into clusters has led to several conclusions, which are as follows:

- Of the settlements of Homokhát, *the villages can present the same rural economic restructuring as the towns*, which are even so able to change on a larger scale due to their size, and economic and social weight. This phenomenon proved true at the level of the indicators, but not in regard to the absolute numbers, as the scale of a town and a village is different. The above finding is true with respect to all the examined indicators, with the exception of the trend in population density, as the expansion of population density in the villages greatly exceeded that of the towns, to the extent of 12%.
- Due to the above conclusion, this large expansion is only thanks to those settlements which are satellite settlements of Kecskemét or Szeged, or belong to greater Budapest. So if we remove settlements in the cluster of satellite settlements from the list of villages, then we get a much more drastic picture, because in that case the population density of the villages has not grown, but fallen. The extent of the fall already exceeds 6%. *So the population concentration around the big cities is of a visible and perceptible size.*
- In the appearance settlement group there is a significant number of large towns, which may appear to be developing well, but their population densities fell to a considerable extent, by almost 5%, and their natural decrease also stands out from every settlement group with its 8,6%. The fall in the proportion of young people, however, is more favourable at a mere 6%. In my view the reason for this is the *large-scale suburbanisation process*, the winner of which is the cluster of satellite settlements.
- The process named above, however, has been visibly in progress, not for a couple of years, *but for decades*. An outcome of this is that the *social weight* of the settlements (younger age structure, more resident, more graduates) belonging to the satellite settlement *group is constantly growing, but their economic and employment weight (fewer SZJA payers, fewer companies, less*

EU support) is more likely falling. And this is attributable to the fact, that those living in these settlements just use them as a place of residence, but they go to the big cities to work and study.

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