

THE POPULATION RETENTION OF THE NORTHERN GREAT PLAIN REGION ACCORDING TO THE AGRICULTURAL AND RURAL DEVELOPMENT

CSABA SZABÓ – FERENC ARANY

Doctoral School of Economics and Regional Sciences, Hungarian University
of Agricultural and Life Sciences, Gödöllő
szabocsa92@gmail.com, aranyferenc10@gmail.com

Summary

EU agricultural policy accounts for almost one third of the European Union's budget. The two pillars of the Common Agricultural Policy have focused on two main objectives. One is to provide Member States with affordable and balanced food. The other is to maintain and raise the living standards of farmers and people living in the countryside in a sustainable environment. Our main goal is to explore the situation and characterization of the population retention power of the rural economy in the Northern Great Plain region.

Keywords: countryside, support, cluster, district, difference

Signal Classification: P25

Introduction

EU agricultural policy accounts for almost a third of the European Union's total budget. The significant amount of budget is and will be decided by the Member States before each 7-year cycle. Each country pays 1% of its GDP into the central budget. The two pillars of the Common Agricultural Policy focus on direct support and market measures, the other on rural development. The former is used to provide affordable and balanced food. The second is to maintain and raise the living standards of farmers and people living in rural areas while meeting sustainable environmental challenges. There are approximately 500 million people in the European Union who are committed to maintaining rural life and a healthy lifestyle.

The amount of support is distributed through the European Agricultural Guarantee Fund and the European Agricultural Fund for Rural Development not only to nearly 22 million farmers, but also to non-governmental organizations, municipalities and organizations meeting various territorial needs. In the face of significant global competition, subsidized, free-form agriculture cannot be allowed. In the 2007-2013 and 2014-2020 budget cycles, in addition to direct subsidies, a significant amount of nearly HUF 1,300 billion was available under the rural development program. And the V4 countries aim to preserve these development opportunities beyond 2020 as a means of promoting territorial cohesion. The emphasis on sustainable development deserves to be included in catching-up and development policies in several respects. In addition to the most emphasized environmental sustainability, it is also worth mentioning social lighting. Socially sustainable development differs from the concept of sustainable development in that it places greater emphasis on the protection of social aspects so that social complexity comes to the fore during the enforcement of environmental and economic interests (Kovács-Szirmai, 2006).

The Union's rural policy in Hungary consisted of 4 columns during the year of the NHRDP. The domestic distribution of external resources has been developed along these themes. (NHRDP, 2007-2013)

I. Competitiveness axis: Increasing quality and added value in agriculture, forestry and food processing

II. Axis of environmental management: Rationalization of land use taking into account environmental and natural values.

III. Axis of rural development: Expansion of rural employment, diversification of activities

ARC. LEADER axis: Development of local communities

Prior to the 2014-2020 cycle, there were serious debates about such large-scale use of Community funds, but it was eventually voted on by the European Commission, although the environmental criteria, which Member States are obliged to comply with, were tightened (Rákóczi, 2016). The Rural Development Program for the 2014-2020 cycle, based on the complete rethinking of the NHRDP, shows the Hungarian rural and complex co-thinking. With the abolition of the axes described above, Hungary voted more for more diversified development. While the previous cycle was largely a static development line, envisaging development along the main

agricultural-oriented corridors, the VP was already organized along a more diverse, chiseled structure to achieve the goals of the Europe 2020 strategy. According to Káposzta and Tóth (2013), “localization related to globalization, which has led to the appreciation of rural areas and the expansion of opportunities, by emphasizing the role of local values and internal resources, is important.” The strategies developed should be used to exploit these values. Instead of rigid rules, 6 main priorities have been identified:

1. Knowledge transfer and innovation in agriculture, forestry and rural areas
2. Viability, competitiveness and sustainable forest management of agricultural holdings
3. Food chain organization, including, inter alia, the processing and marketing of agricultural products, animal welfare and risk management
4. Restoration, conservation and enhancement of agricultural and forestry ecosystems
5. Resource efficiency and the shift towards a climate-resilient economy in the agricultural, food and forestry sectors
6. Social inclusion, poverty reduction and support for economic development in rural areas.

Based on the above, in addition to economic objectives, attention has been paid to meeting environmental challenges, in particular social problems, food and food security crises, and energy efficiency. The topicality today is an investment financed from national resources and preferred by the Government, in which farmers can create solar farms consisting of low-power power plants. The priorities are fully permeated by the spirit of sustainability set out in the Brundtland report. Intensive agricultural development can bring about a kind of diversification that exploits the development of agricultural areas and even provides higher incomes for those who live there. Diversity can also reduce exposure to subsidies over time (Káposzta, 2007).

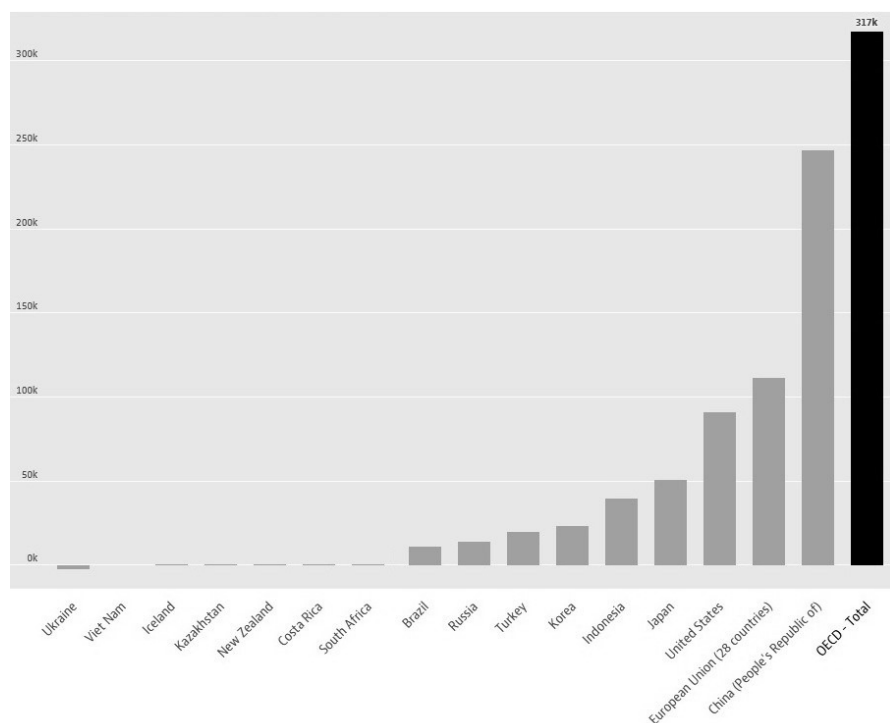


Figure 1: Amount of agricultural subsidies in each country 2013-2016

Source: OECD, 2016.

Figure 1 illustrates well the emphasis on agricultural subsidies in each country or group of countries and the differences in ratios. The largest amount is occupied by China, the second by the European Union and the third by the United States, and even Japan by protectionist agricultural policy.

Striker interprets the concept of the countryside as a dynamically changing action defined by geographical processes. They lead from landscape and nature protection, the exploitation of specific resources (eg wind, water, biomass and recreational resources) and food production, which can be considered a classic task, to their residential and employment functions and their fulfillment, which is now characterized by modernized rural living conditions (Csatári, 2000).

The common view is that the main measure of rurality is population density. However, there have been serious debates about setting a threshold for this metric. It is set at 100 people / km² as defined by the European Union, but is already considered by the OECD to be less than 150 people/km². Rural areas were classified into three categories, the first group being “basically an urban area with a proportion

of less than 15% living in a rural settlement. The next section is the “typically rural area” where the proportion of people living in a rural settlement is between 15-50%. The most common is the ‘basically rural area’, where the proportion of people living in rural settlements is over 50%. The delimitation in Hungary chose the golden mean road on the basis of 120/ km², which was included in the National Spatial Development Concept adopted in 2005. The analysis of Eger and Peasant (Figure 2) also reveals the attitude of the Northern Great Plain region, as they also called it “Agricultural Region”, because the agricultural land use is the highest here and the population concentration is significantly low (Egri and Peasant 2013).



Figure 2: Urban / urban clusters in Central and Eastern Europe

Source: Eger and Peasant, 2013

As we live in the “Storm Corner”, we would like to explore the problems and difficulties of the Hungarian countryside by examining the regional differences in the region. We will face important challenges in the coming years, such as the migration of the Hungarian population, aging, social exclusion or labor shortages. Our main goal is to explore the situation of the population-retaining power of the rural economy in the Northern Great Plain region in 2010. We would like to perform further analyzes to predict future changes.

Material and Methodology

In our research, we intended to explore the regional differences of the Northern Great Plain region using the following methods. These three NUTS3 territorial units are made up of a total of 32 LAU1 regions. The LAU1 level (Local Administrative Units) can be considered as a relatively homogeneous area with

several settlements, which is the district level in Hungary. At this territorial level, the European Union does not collect data. Data were retrieved from the TEIR and Resource Map systems for 2010. Administratively, there were no districts in the landscape at that time, as the 2012 XCIII. Act “On the Establishment of Districts and Amendments to Certain Related Acts” brought back the system 29 years earlier. The principle of administrative delimitation of districts in its present form was determined along 6 basic factors according to Csíti (2012), which is illustrated by the hexagon in Figure 3.

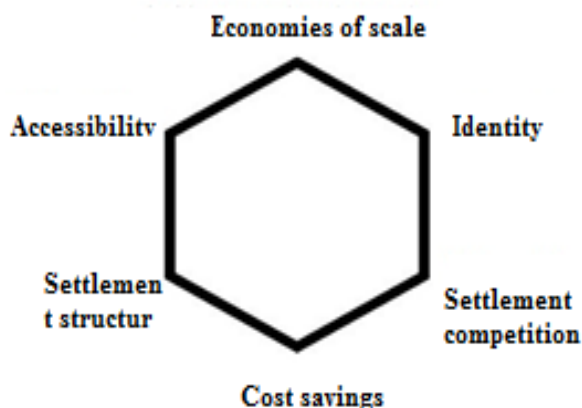


Figure 3: Principles of district design

Source: Own editing, Csíti et al. 2012

By adapting the settlement level to the district system in 2012 and applying the 17 indicators involved, we tried to explore the population retention power of the Northern Great Plain region mostly from the point of view of agriculture. According to Imre Lengyel, the competitiveness of districts can be determined along two main lines:

It approaches territorial competitiveness from the point of view of economic theories. He formed four groups based on their potential: weak, below average, medium, and strong. Almost all districts in the Northern Great Plain region are at medium and below level, but Jászberény belongs to the group with strong competitiveness, which can be justified mainly due to its proximity to Budapest (Lengyel I. et al., 2015).

Methods

Factor analysis

During the preparation of my analysis, I performed a factor analysis using the IBM SPSS 20.0 program, which made it possible to explore spatial differences. It is a frequently used tool in spatial structure research because “factor analysis is not a single statistical procedure, but a collective term that refers to a set of multivariate statistical procedures. The method is used to compress the data and explore the data structure and aggregates the number of initial variables into so-called factor variables that cannot be directly observed”. (Sajtos and Mitev, 2007) Factor analysis examines the relationships between several variables that are presumably related to each other.

Cluster analysis

There are two types of cluster analysis, hierarchical and non-hierarchical, also known as the K-means method. According to László Péli, there are two important differences between the two methods. Hierarchical is much more difficult because it compares elements in pairs, so it takes longer to complete them. One difference is that for the non-hierarchical we have to specify the number of clusters. Another is that the middle of the clusters does not have to be given to us, but we can also calculate it with the program (Péli, 2013). The created clusters were represented on the administrative map of the region by a GIS program called Arc Map.

Results

Kaiser-Meyer-Olkin test

Thanks to the KMO test, we can find out how suitable all the variables involved in the analysis are for performing the factor analysis. The result should be between 0 and 1, the better the closer it is to 1. A value above 0.5 is acceptable. During the study, this value exceeded 0.5, more precisely 0.685, i.e. factor analysis can be performed.

Bartlett test

Table 1's Bartlett test illustrates whether there is a correlation between the initial variables. It is appropriate if the significance value is less than 0.05 and as

close to zero as possible. In our case, it is exactly zero, so the factor analysis can be considered feasible.

Table 1. Kaiser-Meyer-Olkin and Bartlett test in 2010

<i>Kaiser-Meyer-Olkin Measure of Sampling Adequacy</i>	,685
Approx. Chi-Square	824,330
Bartlett's Test of Sphericity df	153
Sig.	,000

Source: Own editing, 2021

Full explained variance

The total explained variance shows how many factors were created. The component column contains the number of factors. The percentage of aggregate variance is largely determined by the research area. A value above 95% is accepted in the natural sciences, but above 60% is already acceptable in social science analyzes. In our case, the table below shows the eigenvalues of the initial and rotated matrices, in which the value of the cumulative variance is most important to us. As a rotation, the retention of factors information becomes more understandable. The value reaches 60% and even reaches 82,434, according to which it compresses an adequate amount of data. (Sajtos-Mitev, 2007)

Table 2. Variance in 2010

<i>Com- ponents</i>	<i>Cumulative variance</i>			<i>Eigenvalues of a rotated matrix</i>		
	<i>Total</i>	<i>Explained variance</i>	<i>Cumulative variance</i>	<i>Total</i>	<i>Explained variance</i>	<i>Cumulative variance</i>
1	8,608	47,823	47,823	7,116	39,535	39,535
2	3,060	17,003	64,826	3,241	18,004	57,539
3	1,933	10,740	75,566	2,459	13,659	71,199
4	1,236	6,868	82,434	2,022	11,235	82,434

Source: Own editing, 2021

Rotated factor weight matrix

It is used to explore the relationships between the indicators used in factor analysis. Its value is between 0 and 1, which shows its relationship to the resulting

factor. Numbers in absolute terms below 0.3 are not taken into account because they are not strong enough. According to the most common interpretation, above 0.5 is already considered good. The direction of the relationship is indicated by the signs as they relate to the other variables. In the course of the analysis, uninterpretable relations can be created, between which there is no real correlation, the rotation is used to eliminate this.

Table 3. Rotated factor weight matrix

<i>Indicators</i>	<i>Komponens</i>			
	<i>R+D</i>	<i>Countryside workers</i>	<i>Support</i>	<i>Fruit of the countryside</i>
Knowledge-intensive serv. providing company	,978	-	-	-
Higher than 25 years of age with a diploma	,976	-	-	-
They are employed locally	,965	-	-	-
It is a company operating in high-tech industry	963	-	-	-
Population	,959			
Population density	,904	-	-	
Medium is a high-tech operating enterprise	,900	-	-	
Old age index			-	,745
Proportion of lawn users	-	-	-	-
Employment	-	,781	-	-
Number of arable users	,428	,679	-	-
LEADER grants	,519	-,569	-	-
Support for measures to improve competitiveness	-	-,566	,881	-
Rural development aid	-	-	,713	-
Proportion of people employed in agriculture	-	-	,631	
Proportion of orchard users	-,524	-	-	
Ratio of Gypsies	-	-	,412	-,787
		-,448		-,487

Source: Own editing, 2021

During the preparation of the article, we used the indicators shown above, which made it possible to analyze the countryside from an agricultural point of view, without losing important social and development indicators. During the factor analysis, four reliable groups emerged, the correlation of which is explained in the following four paragraphs.

1. Factor: R&D

Here, the most knowledge-intensive factors were found, such as the number of people over 25 with a university or college degree, the number of locally employed, the number of enterprises operating in high-tech industry, or the number of knowledge-intensive service farms. There is a very strong link between these, but we cannot ignore the fact that the number of people employed in agriculture is moving in the opposite direction.

Factor 2: Workers' countryside

In the "Workers' countryside" group, employment, the number of grassland users, the number of arable land users and the amount of LEADER applications submitted per capita fell. Where the number of land users is low, employment and grassland users are high. The proportion of the Roma population moves in the opposite direction to employment.

Factor 3: Support

It is clear that this factor focuses most on subsidies. In areas with high agricultural employment, the amount of per capita measures to improve rural development and competitiveness is high.

Factor 4: Fruit of the countryside

Based on these, it seems to be true that the fruit is rejuvenating, as the number of people engaged in fruit growing is in the opposite direction to the old age index, but moves in the opposite direction to the Roma population.

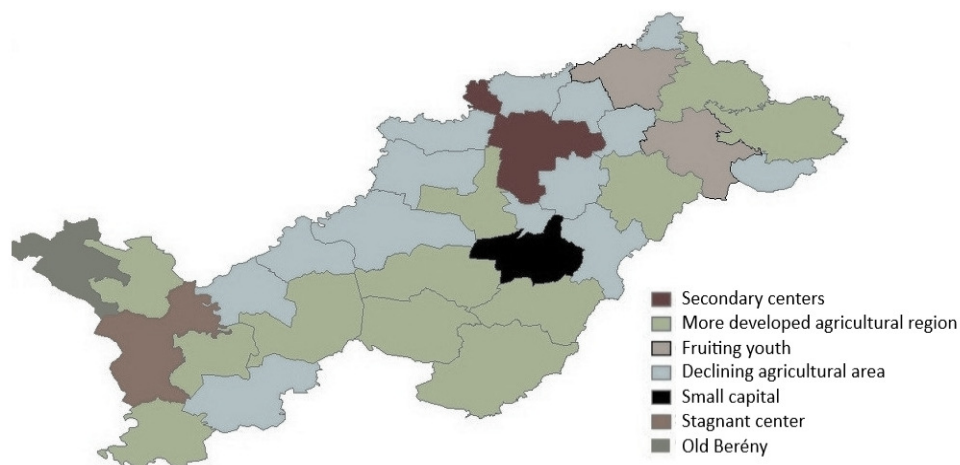


Figure 4. Created clusters

Source: Own editing, 2021

During the cluster analysis process, 7 clusters were created, which are represented on the map above. The groups were named according to their most characteristic properties, which are detailed below.

1. Secondary regional center

The Nyíregyháza district was included in the first cluster, which is the secondary center of the region, because Debrecen surpasses it in all respects. This district includes the county seat of Szabolcs-Szatmár-Bereg county, Nyíregyháza. The city has the Nyíregyháza College, which is one of the bases of knowledge in the region. The number of graduates in the area is very significant. Here the second highest population density, employment is also higher than the regional average. The proportion of locally employed is outstanding, but the old-age index can be considered relatively low compared to the average of the other two county capitals. The number of knowledge-intensive service companies and users of the high-tech industry are also performing well for the current cluster. The proportion of Gypsies in this district is the lowest in the region, at only 0.6%.

2. More developed agricultural region

These districts consist of quite good districts, mostly of an agricultural nature. This kind of attitude is well illustrated by the fact that the population density is the

lowest here, but the proportion of agricultural employees is quite high, such is the case in Hajdúböszörmény, Karcag or Püspökladány. Support for competitiveness and rural development has been concentrated in these districts. Old age is below average, but in terms of other non-county seats, the number of people over 60 per 100 young people is the worst. The proportion of Roma in the population is high and the number of companies operating in high-tech manufacturing is very low, which means that the islands of innovative technology are mainly located in districts with cities of national importance.

3. Fruitful youth

The districts of Kisvárd and Mátészalka are located in this cluster. Areas with a higher population density, which can be justified mainly by fruit-growing traditions. Compared to the other two cultivation branches we examined, almost a third of the production area is occupied by plantations. Significant beneficiaries of the New Hungary Rural Development Program were fruit-growing small and medium-sized farms and this can be seen in the per capita support sources. Employment is very low, which is possible due to the number of people working in their own economy. Here, the proportion of the Roma population is the highest and the number of young people over the age of 60 is the lowest.

4. Declining agricultural area

These districts also performed very poorly in terms of population and innovation metrics. The number of locally employed people is very low, in the case of these districts a kind of agglomeration extraction effect can be seen by their county center, as in the case of Nyíregyháza. The number of graduates is very small for the population. In addition to high agricultural employment, it is very much coupled with the low population density typical of rural areas. In all respects, the development of these areas can be of strategic importance.

5. Small "capital"

The district of Debrecen was included in a separate cluster, which I named "capital" because it has played this role several times in history and is the second largest city in the country. Its knowledge center is the University of Debrecen, which can rightly be called one of the research bases in the eastern part of the country. Overall, the number of graduates is highest here, even in terms of population, as almost one

in five people has a university or college degree. Most high-tech and medium-high-tech manufacturing companies are based here, almost half of the region as a whole. The city also has an airport, which further increases its embeddedness in the large area. Large companies competing in global markets can also be found, such as renowned representatives of the pharmaceutical industry, Teva and Gedeon Richter. Typically, the whole district is Debrecen and its agglomeration, because only the settlement of Hajdunánás can still be found here. In the proportion of the population, the region received very significant amounts of support to develop competitiveness. Of the three main agricultural sectors, fruit production dominates the most. The value of the old age index is high and the proportion of the Roma population is low.

6. Stagnant center

The area with the third county seat is the Szolnok district. It is considered to be the most backward in terms of other centers. University education can be found in terms of János Neumann University, which is why the number of graduates in the proportion of the population is at the level of Nyíregyháza district. The number of enterprises using manufacturing innovations is high, but it does not even approach the two more eastern urban areas. It has a low population density, the main reason for which lies in the administrative delimitation, compared to the fact that it has quite a small amount of money for rural development with significant land. The per capita amount of measures to improve competitiveness is the lowest in the region. It has the second highest employment rate, coupled with high old age, which is a sign of social decline.

7. "Old Age"

It consists of the Jászberény District, which is the westernmost area of the Northern Great Plain region. There are three cities here, based on the data included in the analysis, a kind of transition between the county seat and the agricultural districts. The Szolnok district is almost approaching the enterprises performing in the high-tech and medium-high-tech manufacturing industries, which can be interpreted mainly due to its proximity to Budapest. In addition to employment, it has the highest old-age index in the region, which is why the cluster got its name. As a proportion of the population, the number of graduates is also significant, however, enterprises providing knowledge-intensive services are less widespread. The Faculty of Applied Arts and Pedagogy of Károly Eszterházy University is located in the district center.

Conclusions

The districts of the Northern Great Plain region in general can be said to be rural except for the districts with a big city. In rural areas, the population density is low, they are the main beneficiaries of subsidies and the developed processing industry can only be found in traces. In terms of agricultural branches, they follow the local conditions and traditions. The beneficiaries of the subsidies are mostly farmers cultivating large arable land and grasslands, as the per capita subsidy is lower in the more populous “Fruitful Youth” cluster dealing with fruit production. The proportion of Gypsies is also higher in the more backward districts. There is a clear advantage over county-dominated districts, although society is the oldest here. Debrecen is a worthy center of the region, as it is home to high-tech manufacturing companies and companies providing knowledge-intensive services, as well as a highway to the west and an airport for international flights. Nyíregyháza and Szolnok no longer have such an important weight, they are rather only major cities on a national level, although due to its proximity to Debrecen, Nyíregyháza enjoys an advantage in terms of potentials. Education is important in the life of cities and regions, which are the engines of development. It turned out that local universities and colleges are also a professional supply of innovative local businesses and manufacturing. The highest level of local employment can only be achieved through a highly qualified and capable human resource. My hypothesis that there is a link between employment and subsidies is only partially true, because NHRDP subsidies show a correlation only with agricultural employment. In the case of the old-age index, I have to reject my statement that the countryside is more affected by aging because there is no visible link between population density and the old-age index.

Summary

During the introduction, we touched on the information related to the most important agricultural support system, highlighting the New Hungary Rural Development Program and the Rural Development Program, which is in its current cycle. We looked at the support policy of the world with the help of an illustrative figure, and then other researchers also confirmed the results of our literature research in terms of the agricultural orientation of the Northern Great

Plain region. In the material and methodology chapter, I explored the characteristics of the study level, ie the LAU1 walking level. By cluster analysis, the 32 districts were arranged in homogeneous groups and 7 clusters were formed. Groups presenting urban and rural characteristics were formed. The results are shown on a map, which is a good illustration of each cluster group. Subsidies for competitiveness and rural development focus on rural areas. The optimized use of the subsidies provided by the European Union plays a key role in the catching-up of the Hungarian countryside. Our further goal is to explore the changes that have taken place since 2010 and the possible development opportunities in support and development policies, especially in Hungary and later in Central and Eastern Europe.

Bibliography

- Csite András - Oláh Miklós - Szalkai Gábor (2012): A területi közigazgatás reformját elősegítő tanácsadás a modern kori járások központjainak és lehatárolásának tárgyában, Összefoglaló tanulmány, Budapest
- Egri Zoltán - Paraszt Márta (2013): Urbanizáció Kelet-Közép-Európában – A várostipológia kísérletei Lukovics Miklós – Savanya Péter (szerk.) 2013: Új hangsúlyok a területi fejlődésben. JATEPress, Szeged, 79-98. o.
- Földművelésügyi és Vidékfejlesztési Minisztérium (2010): Új Magyarország Vidékfejlesztési Stratégiai Terv 2007-2013
- Káposzta József (2007): Regionális gazdaságtan jegyzet, Gödöllő, 82-102.pp
- Káposzta József és Tóth Tamás (2013): Regionális és vidékfejlesztési ismeretek /Elméleti jegyzet/ Debreceni Egyetem Gazdálkodástudományok Centruma
- Kovács Zoltán és Szirmai Viktória (2006): Városrehabilitációs beavatkozások és a térségi társadalmi kirekesztés: a társadalmilag fenntartható városfejlődés Budapesti lehetőségei, 'Tér és Társadalom 20. évf. 2006/1. 1-19. p.
- Lengyel Imre, Vas Zsófia, Lukovics Miklós, Gyurkovics János (2015): Vidéki járások versenyképessége Magyarországon, Szegedi Tudományegyetem Gazdaság- és Vállalkozásfejlesztési Központ, TÁMOP 4.1.1.C-12/1/KONV-2012-0004, Szeged
- Magyarország Kormánya (2014): Vidékfejlesztési Program www.palyazat.gov.hu

- Magyarország Kormánya (2017): 2125/2017. (XII. 29.) Kormány határozat: a magyarországi napeleemes beruházások fejlesztéséhez szükséges intézkedésekről, Netjogtár
- Péli László (2013): Növekedési pólusok főbb regionális gazdaságtani összefüggéseinek vizsgálata Magyarországon, Doktori értekezés
- Rákóczi Attila (2016): Kunhalmok és emberek az évezredek sodrában. A Magyar Természettudományi Társulat, Budapest, 35-41.pp
- Sajtos L. - Mitev A. (2007): SPSS kutatási és adatelemzési kézikönyv. Budapest: Alinea Kiadó, 402 p.