
The Effect of Regions on Agricultural Enterprises in Szigetköz Hungary

The effect of agglomeration on settlements' agriculture^[1]

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Abstract

The analysis demonstrated in this study is the first part of a wide range of investigations. This study includes the history of the farming practice in the region and deals with registered agricultural joint ventures in the region. In my research work I tried to answer the question: How can regional characteristics differentiate farming practice and the number of agricultural enterprises and the profile of their activities. There is a major difference to be detected in the numbers and activities of agricultural enterprises within a certain region. Approaching to Győr, the region's main city and seat of the county, we can observe a decrease in the numbers of agricultural enterprises although the arable land there is excellent. At the same time the number of inhabitants in those rural communities increases together with the proportion of houses in areas that were earlier used for farming and as a result there is a higher rate of population with solvent demands as well. Agricultural services gain on importance in the communities in the agglomeration of Győr constantly.

SZIGETKÖZ: INTRODUCTION

Szigetköz is the area of Kisalföld that is surrounded by the Danube and its branch called Mosoni Duna. Being the largest island of Hungary its area covers 375 km², it is 52 km in length and 8-10 km in widths. Szigetköz is a perfect plain, there are only some centimetres high differences in elevations. Side branches, islands and rocks characterize its surface.^[2]

Balogh says the landscape of Szigetköz has thousand faces. Szigetköz and its region is Hungary's western "gate" and the borders of three countries meet there. Szigetköz is organically included in the Danube-region, it is the point of junction

[1] The research was supported by the EFOP3.6.1-16-2016-00017 project

[2] Nyugat-Dunántúl 2014-2020. évi Regionális Fejlesztési Stratégia, Nyugat-Pannon Terület- és Gazdaságfejlesztési Szolgáltató Közhasznú Nonprofit Kft. 2013.

of north-west and east-west running infrastructural networks and tourist routs. Besides Szigetköz is home of one of the country's most protected natural sanctuaries (Szigetköz Area of Outstanding Natural Beauty) and one of the most developed regions, exemplary in its renewal but also transforming and modernising.

Alexay (1982) describes the region as follows: this micro-region can be found in the centre of Kisalföld surrounded by the Old-Danube and the Mosoni-Danube. It is the home of the Danube's once uncontrolled branches and forested islands. It is 375 square kilometres, about 65 000 cadastral acres large. Regarding its size, it is Hungary's largest river island.

Danube is a determining factor in the area of Szigetköz. The other rivers, like the Mosoni Duna, the Lajta, the Rábca and Rába depend on the interflow of the Danube and their water volume is only a portion of its. Entering the plain the Danube deposits its sediment, fills its bed, breaks up into branches and gets into lower course. Danube was first controlled between 1886-1894. After the diversion of the Danube in October 1992 the water discharge reduced to 10-20 percent of the original mean on the 42km long section between Dunacsúny and Szap and the water level of the main branch sank by 3-4 metres. In the Szigetköz we distinguish levels of low and high flood area, as well as surfaces with wind-blown sand. Every variation of the soil development can be found in Szigetköz and its regions: alluvial soils, meadow soils and chernozem soils. /Reflex Környezetvédő Egyesület, 2004/

Szigetköz can be divided according to different aspects: administratively two districts cover the area one of Mosonmagyaróvár and the other one is of Győr.

According to the direction of streamflow and local production characteristics we can divide Szigetköz into three micro-regions:

1. Upper-Szigetköz (from Rajka - Cikolasziget - to Halászi) its local production characteristics (more shallow cover layer soils, ground water can be found in the gravel section and usually very deep) are a bit worse than the area's average. There is no area with outstanding yield, but more areas can produce good and medium-good yields (areas with lower locations)
2. Middle-Szigetköz (From Cikolasziget - Halászi to Ásványráró) its characteristics approach the average of the region (Szigetköz) or are a bit better (there are more shallow cover layer soils, and lower areas near the Danube have higher ground water level). There are more areas that produce outstanding yields every year.
3. Lower-Szigetköz (from Ásványráró to Vének) its local production characteristics are better than that of the Szigetköz average (many deep laying areas with higher ground water level). There are many areas with outstanding yields. Traditional vegetable production areas of Szigetköz can still be found there (Zbó, 2005).

As per regional development Szigetköz can be divided into Upper-Szigetköz and Lower-Szigetköz. Communities of Upper-Szigetköz are Dunakiliti,

Dunasziget, Feketeerdő, Mosonmagyaróvár, Halászi, Kisbodak, Püski, Máriakálnok, Kimle, Dunaremete, Darnózseli, Lipót, Hédervár, Mecsér, and Ásványráró, while Dunaszeg, Győrladamér, Győrzámoly, Győrújfalú, Győr, Vámoszabadi, Nagybjacs, Kisbjacs, Vének belong to Lower-Szigetköz. Because of its location it can be regarded as one of the richest regions in the country. The neighbourhood of Austria has a strengthening effect on one hand, but the demand on labour tends to brain drain on the other hand. The factory complex AUDI seated in Győr and the joining industrial and service basis mainly affects the infrastructure of Győr and its region contributing to the rapid development of population with solvent demand for agricultural products.^[3]

RECALLING THE FARMING PAST IN THE REGION

Kovács (1992) – a researcher dealing with the ethnography of Szigetköz– describes the history of animal breeding in the region as follows: Animal breeding in Szigetköz has got a thousand- year-long tradition. Not long ago it was the main income of families. Natural housing and semi-natural housing systems were then wide spread. The author's research work in the dialect of the Szigetköz region revealed many elements originating in the traditions of animal breeding and they remained a part of the living memory. Although many phrases got forgotten, some of them are still reflected in the dialectal language thus enriching our culture.

The lower areas of Szigetköz with their meadows and pastures ensured excellent possibilities for shepherding. Animal breeding was based on the natural forage grown in the flood area. Cattle, horse, swine and poultry keeping and breeding was typical in Szigetköz. Native breeds that excellently accommodated to the extensive, natural farming and housing system (grey cattle, Bakony swine etc.) spread in the region. The animals were kept on pasture from early spring to late autumn. If they grazed off the pasture they were driven to another pasture swimming from one island to the other one. Natural locations of Szigetköz were suitable for keeping water fowls, too. /Horváth, 2006/

After the regularization and embankment of the Danube agriculture started to develop and changed the system of animal keeping and the way of life of the people living in the communities of Szigetköz. Animal keeping became more intensive, closed housing spread quickly. As fallow-farming stopped crop-rotation required more and more organic manure, which could have been ensured by closed housing system, only. The new farming system preferred forage growing, which required to break the excessive pastures and start professional ley farming /Timaffy, 1970., 1980/

[3] Nyugat-Dunántúl 2014-2020. évi Regionális Fejlesztési Stratégia, Nyugat-Pannon Terület- és Gazdaságfejlesztési Szolgáltató Közhasznú Nonprofit Kft. 2013.

Changes in the system of animal breeding in Szigetköz in the second half of 20th century were also proved by *Tenk* (1993). His research work revealed that the changes in the numbers of the animal population (continuous decrease) was a country wide incident. Although the size of the decrease was far behind the country's average in Szigetköz it clearly shows the tendency. The author's investigations also prove – regarding the year 1988 as etalon – that milk production reduced by 30 %, pork production by more than 40 % till 1993. He came to the conclusion that the problems of the producers (farmers) were the same as in the whole country but Szigetköz was overloaded by the ecological changes induced by the diversion of the Danube in the years after.

Rechnitzer (1993) came to similar conclusions. He predicted that farming in Szigetköz would become less important, but due to their favourable natural characteristics their performance would exceed the county's average. He thinks that the changes in the natural-environmental characteristics of Szigetköz would not hinder a sudden stop in the 'socio-economic' milieu of the region. Rechnitzer referred to signs of uncertainty that had accumulating effects on other factors and participants and might question the future of the micro-region and could have a bad influence on the lives of the people living there. The author writes: „Szigetköz developed from a typical agricultural raw material producing region into an agricultural-industrial area. Future means to explore local natural endowments more completely and more consciously and regional development can attract capital investments as well. It would be a serious failure to leave this valuable example of the Hungarian modernization to its fate, or be doomed to destruction.”

Kocsisné (2004) investigating farming practice in the county of Győr-Moson-Sopron revealed that in the county (like in Szigetköz) investments were mainly made in the industry and tourism. As a result, farming (producing raw materials) was pushed back and lost its importance a bit.

Salamon (1992) investigating the production structures of the Kisalföld region (and of course that of Szigetköz)- and analysing data of the West-Transdanubian region in the period of 1986-1990- came to the conclusion that there was a sever loss in the animal produce of the region. Beef cattle products decreased by 23.2 %, mutton sheep products by 37.8 % and meat poultry products by 0.8 %. Only the volume of meat type swine increased by 6.3 %.

AGRICULTURE IN SZIGETKÖZ TODAY

First of all, I think it is important to describe agriculture in the county of Győr-Moson-Sopron briefly. A plain builds the centre of the county's area with excellent agricultural endowments. The ratio of the farmland equals that of the country's average, but the tilled area is larger. Traditional agricultural branches are typical, like intensive vegetable growing, fruit growing and the decline of the

related food industry.^[4] The proportion of the agricultural area amounts 63% (256 Thousand ha), which equals the country's average. Its territory slightly reduced in the past years. Since 2005 the size of the agricultural areas has continuously been reducing mainly because of enlarged urban areas and industrial zones, but at the same time the size of the forests and fish ponds has increased as well. The quality of the arable land in the county greatly varies. Therefore it is necessary to protect good quality arable land effectively. About 17% of the arable land in Győr-Moson-Sopron county belong to the excellent quality tilled land area. The surroundings of Mosonmagyaróvár and Győr can be highlighted among them. In the county we can observe further decline of the agricultural sector that lost 0.5% points from its role during 10 years. In 2009 it achieved only 3.6%, which is about the average of the EU27. Among the structural characteristics of the sector we should stress that despite of the structural changes corporate enterprises remained the units that employed the highest number of employees. Among the enterprises private ones prevailed numerically, mainly because earlier employees after having lost their jobs – due to their knowledge, profession and close connections to the countryside – found a living in the frame of private business.^[5]

The literature of the agriculture of Szigetköz is quite sparse. *Timaffy László* dealt with the agriculture of the area more detailed but regional reports and development concepts mentioned it only peripherally.

Similar to the county there is a high proportion of the used agricultural area out of the total area showing the dominance of the farming participants. Except for Dunakiliti, Vének, Dunasziget and Mosonmagyaróvár this proportion approaches or respectively exceeds 80%. As for Dunakiliti this proportion is greatly influenced by the 1200 hectares that were taken from tillage because of the built river barrage. About fifth of the arable land of the county can be found in the micro-region of Mosonmagyaróvár supporting the importance of farming. The largest part of the arable land is tilled area and forest. The highest proportion of tilled land of the micro-region can be found in Jánossomorja.

The proportion of tilled land is the lowest in the villages Dunaremete and Vének. Among the cultivated crops grapes and fruits have the smallest territory, hardly 1%. In the crop growing system the proportion of the main cultures (wheat, maize, sunflower) within the tilled land exceeds 50 %. The proportion of other crops varies greatly: like peas, silage maize, alfa-alfa or vegetable varieties. Their role accommodates to market changes and forage varieties decline according to the decrease of the number of animals kept in the micro-region. Reducing tendency in the numbers of animals in the country and in the counties also characterize this micro-region. One-fourth of the numbers of cows and

[4] Kistérségi programozási tevékenység a Mosonmagyaróvári KSK kistérségben (2005). HHP Contact Tanácsadó Kft. 65. p.

[5] Győr-Moson-Sopron megye Területfejlesztési Koncepciója (2013). Universitas-Győr Nonprofit Kft. 30. p.

one-fifth of the swine-number in the county can be found in this micro-region. The high proportion of animals demonstrate that the micro-region has a main role in producing animal products in the county (milk, pork, chicken and eggs).^[6]

Based on former research I could show that agriculture in Szigetköz is formed by the following main regional factors:

- the value of the landscape in Szigetköz;
- ecological damage that hit the region;
- excessive proportion of industrial investments caused unfavourable conditions for agricultural production: the reduced volume of raw material production in agriculture;
- declining role of agricultural activities in the society;
- Social-economic deviations in Szigetköz influencing agricultural production (Lower-Middle- and Upper-Szigetköz). (Horváth, 2007)

Nation-wide incidents, like raw material shortage, concentration of production, disintegration of animal product sector, inevitable accommodation to market conditions, marketing uncertainty due to multiple actors in the market, food quality and security requirements as well as a weak protection of producers' interests and the fact that the region lost the large animal keeping estates and private farms and as a result a wide range of animal products got lost that were typical for the region.

Based on my investigations I can characterise agricultural production in the region as follows:

- reduction in the numbers of the animal stock and farms
- outdated machinery and technology
- reduction in the numbers of animal products
- shortcomings of the vertical product line
- under-utilization of the possibilities of grassland farming offered by the nature in Szigetköz
- lack of motivation for production (Horváth, 2008)

Based on the evaluation of a questionnaire the Municipal Development Plan of Győrzámoly refers to agricultural activities in the community as follows:

- Strengths: good quality soils support wide ranges of agricultural and horticultural utilization
- Weaknesses: high proportion of homogenous arable fields, low level of business activity within the community
- Opportunities: due to higher demands on residential areas municipality-owned territories were offered for this purpose.
- Threats: agricultural sector is declining, as a result the communities lose

[6] Kistérségi programozási tevékenység a Mosonmagyaróvári KSK kistérségben (2005). HHP Contact Tanácsadó Kft. 65. p.

relations to the close environment of their village. Villages' standardisation is going on. They lose their provincial character therefore they will be less attractive destinations for eco-tourists. The region becomes a route for transit traffic with its bad impacts e.g. higher environment pollution. Further on the Plan of Győrzámoly regards the lack of larger industrial enterprises in the village as one of the most serious problems, because they could create jobs. Therefore people have to look for jobs, mainly in Győr, and the village becomes a 'sleeping one'.^[7]

Similar statements can be found in the Development Plan of Dunaszentpál: A great proportion of homogenous tilled fields characterize the region, but the rate of forests and grassland is low in the land use. The proportion of garden and orchard sector is minimal. It is inevitable to change the structure of land use, to reduce the proportion of tilled area, to practice ley farming, afforestation, to increase the proportion of gardens and orchards as well as to introduce and develop organic-farming.^[8]

Dealing with the agriculture in the region it is important to keep in mind that 20% of Szigetköz is protected or specially protected area and priority natural wetland habitat. The vegetation (reed-grass, reeds) of waters and mort-lakes support a rich diversity of wetland birds and fish species, as 80% of the domestic fish species can be found there. Flood-plains support communities of river flats, shallows, groves and marsh-meadows, where we can find valuable species. Besides natural beauties the cultural landscape's rural character is very valuable.^[9]

SETTLEMENTS IN SZIGETKÖZ

15 out of the investigated settlements belong to the Mosonmagyaróvár district and 10 to the Győr district. Below you will find a brief summary of the main factors that characterise the two districts and the agglomeration of Győr.

Since 2013 in Hungary, the Mosonmagyaróvár district has belonged to the county of Győr-Moson-Sopron with its seat in Mosonmagyaróvár. The district is 899.97 km² large with a population of 73135, and population density of 81 capita/km² according to the present data. Three towns (Mosonmagyaróvár, Jánossomorja and Lébény) and 23 villages belong to it.

[7] Győrzámoly településfejlesztési koncepció (2015): Talet-Plan Tervező, Szolgáltató és Kereskedelmi Kft. 82-83. pp

[8] Dunaszentpál településfejlesztési koncepció (2014). Talet-Plan Tervező, Szolgáltató és Kereskedelmi Kft. 65 p.

[9] Győr-Moson-Sopron megye Területfejlesztési Koncepciója (2013) Universitas-Győr Nonprofit Kft.14.;15. p.

The area of Mosonmagyaróvár is the country's gate and at the same time an important economic sub-centre, too. Dynamic development of Pozsony enhanced the agglomeration process that stretched till Mosonmagyaróvár, and got much farther and reached the agglomeration of Győr.

Since 2013 in Hungary the Győr district has belonged to the county of Győr-Moson-Sopron with its seat in Győr. The district is 903.41 km² large with a population of 188162 and population density of 208 capita/km² according to the present data. One city (Győr) and 34 villages belong to it.^{[10][11]}

Most important indices show that the region's economy cannot be regarded as homogenous. This is reflected by comparing the two districts as well. Considerable differences can be observed among the smaller regional units that refer to a north-southern slope of development – clearly reflecting the national, what's more the international tendencies. Basically Győr-Moson-Sopron is an economically developed and dynamically growing county, although we cannot regard it as a unite economic region because the diverse development and dynamics as well as traditional and new systems of economic relations limit the economic dimensions.^[12]

The concept calls attention to the fact that it is desirable to protect landscape values in Szigetköz, and the area of Hanság-Tóköz in the process of a rapid agglomeration, while in several smaller centres (Mosonszolnok, Jánossomorja and Lébény) a vivid reindustrialization is going on, which is organically connected to the vehicle manufacturing functions in Győr and other European centres.^[13]

Every of the studied settlements in Lower Szigetköz belongs to the agglomeration of Győr. Therefore I decided to learn the most important economic indices and characteristics of the agglomeration. Agglomeration of Győr is the second largest one in the country – it includes 68 settlements. Compared to the eligibility of 2003 agglomeration attraction could have been proved for 40 settlements except for Hédervár.

Settlements belonging to the agglomeration of Győr: Abda, Árpás, Ásványráró, Bágyszovát, Bakonypéterd, Barbacs, Bezi, Börcs, Bőny, Dunaszeg, Dunaszentpál, Écs, Enese, Fehértó, Felpéc, Gönyű, Gyarmat, Gyömöre, Győr, Győrasszonyfa, Győrladamér, Győrság, Győrsövényház, Győrszemere, Győrújbarát, Győrújfalú, Győrzámoly, Ikrény, Kajárpéc, Kisbabet, Kisbajcs, Kóny, Koroncó, Kunsziget, Lázi, Lébény, Mecser, Mérges, Mezőörs, Mórchida, Mosonszentmiklós, Nagybaics, Nagyszentjános, Nyalka, Nyúl, Öttevény, Pannonhalma, Pázmándfalú, Pér, Rábacsécsény, Rábatonana, Rábaszentmihály, Rábaszentmiklós, Ravazd, Réta-

[10] Magyarország településhálózata. Agglomerációk településegységek (2014) KSH Kiadvány. 40-49 pp

[11] <http://www.jaras.info.hu/jarasok-tarsadalma>

[12] Győr-Moson-Sopron megye Területfejlesztési Konceptiója (2013) Universitas-Győr Nonprofit Kft. 29.p.

[13] Győr-Moson-Sopron megye Területfejlesztési Konceptiója (2013) Universitas-Győr Nonprofit Kft.

lap, Románd, Sikátor, Sokorópátka, Szerecseny, Táp, Tápszentmiklós, Tarjánpuszta, Tényő, Tét, Töltéstava, Vámoszabadi, Vének, and Veszprémvarsány. The seat of the county maintains closer links to the southern and eastern parts. Its settlements are located in the east side of the county in one block. Population density exceeds that of the agglomeration in six villages – Abda, Nyúl, Györladamér, Győráság, Győrújbarát and Győrújfalu .^[14]

Deconcentration of the population can be observed within the region. It resembles a typical suburban process as the concentration of the population in the centre city stagnates while it is increasing in the neighbouring settlements. This is a natural urbanisation process and refers to the fact that towns and their regions develop together organically.

The region is the target area of nation-wide concentration process, i.e. while the population density in Hungary decreases (due to the decline in population), it increases in the investigated region, especially in its inner zone, close to Győr. Besides Budapest-agglomeration, Győr and its area is an important domestic migration target (hardi, 2014).

In settlements of the agglomerations agricultural areas get more rapidly into other use (greenfield investments, building estates, cable-infrastructure systems, big shopping centres etc.) (Tóth, 2014).

Investigating the agriculture in the settlements we should regard their role in rural development from a special point of view, because the countryside is much more than the place of food and raw material production → it becomes the site of new features and dimensions (e.g. recreation, biological diversity, residential function, environment protection etc.). *All these are competitive advantages against the non-rural areas. It has already been detected and people will feel the lack of nature and this will create a real market to satisfy them:*

- new methods of a spatial use can be detected (e.g. tourism, recreation, preservation of the environment etc.),
- services, industry and technology is spreading rapidly,
- while rural areas are more and more differentiating.^[15]

METHOD OF INVESTIGATION

The investigation covered 25 villages of Szigetköz, the towns (Győr and Mosonmagyaróvár) were not included into the sample.

I summarized the number of joint ventures in the settlements of Szigetköz from the data base of <http://hbi.hu>. On the basis of the TEÁOR numbers and e-reports I selected the enterprises that carried out agricultural activities. Beside

[14] Magyarország településhálózata. Agglomerációk településegységek (2014) KSH

[15] <http://ec.europa.eu/agriculture/rural-development>

the sectoral descriptions and activities including agriculture, forestry, fishing I involved enterprises that dealt with agriculture and food production, so processing industry and businesses dealing with professional, scientific and technical activities were also included. For simplicity further on all the investigated ones will be recorded as agricultural enterprises.

To evaluate the numbers of population, built houses and flats, arable areas and set aside areas I used the data of KSH (Central Statistic Authority) referring to the county and settlements.

In my research I used statistical methods that describe stochastic relations. My aim was to show the influence of a given factor.

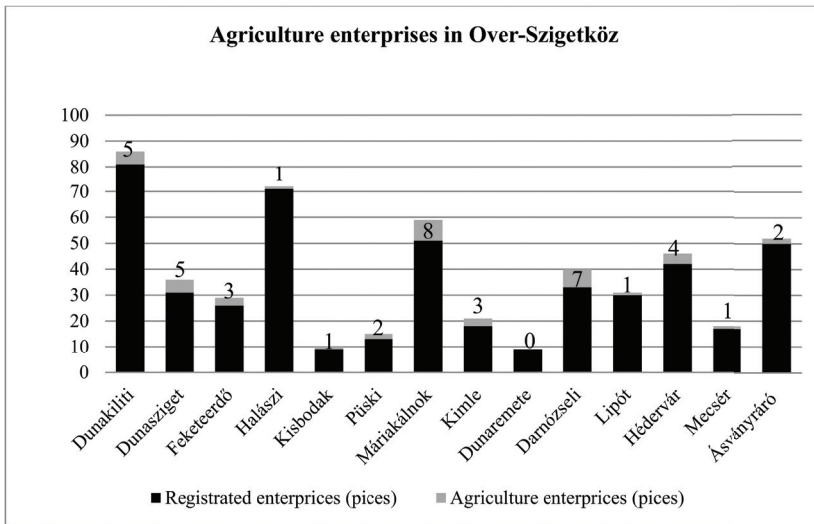
Applied methods:

- t test with two samples to compare the average and deviation of two samples
- calculation of the H and H2 index for mixed relations
- independence analysis, Khi2 test assuming a relation among the quality features
- regression analysis and correction analysis assuming a relation among quantity features
- basic and chain coefficients in analysing time-series

RESULTS OF INVESTIGATION

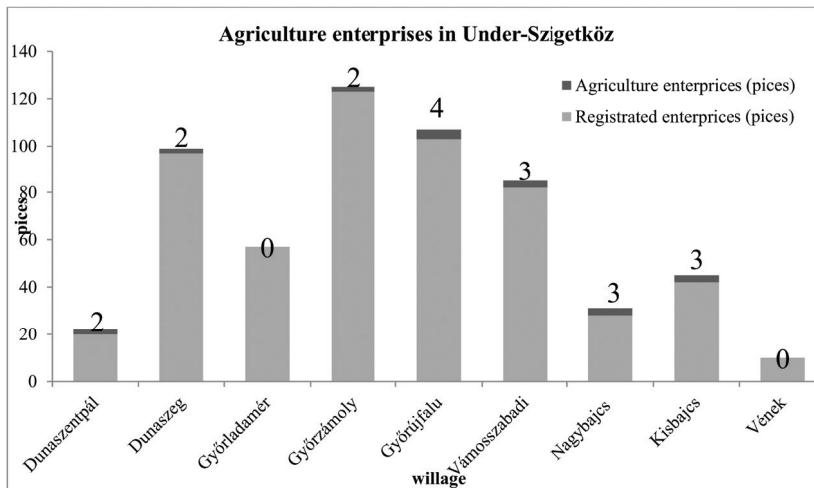
The differentiation in population, economy and development featuring Győr-Moson-Sopron county could be traced in the well definable region of Szigetköz. The study aimed to learn the numbers and activities of the agricultural joint ventures in Szigetköz. The decline of agriculture, the reduction of the proportion of tilled land, the increasing size of set aside areas and other (mainly building) land use could be followed by overviewing the agricultural data of the county. Evaluating the numbers of population and built homes we concluded that there was an intense increase in the population together with a vivid drive to building homes in the communities of Szigetköz. Analysing those factors in the Szigetköz communities of the Mosonmagyaróvár district we revealed that except for two villages (Halászi and Máriakálnok) a slow increase (in some communities rather stagnation) was typical.

Figure 1: Agriculture enterprises in Over-Szigetköz



Source: own searching

Figure 2: Agriculture enterprises in Under-Szigetköz



Source: own searching

The decline in the agricultural activity could have been induced by the increasing number of set aside areas. To prove this I compared the numbers and deviation of the agricultural businesses in Lower and Upper Szigetköz communities. There

are apparently less agricultural businesses in Lower Szigetköz (Figure 1. and Figure 2.) and the considerable difference in the numbers of enterprises and their deviation from the average between the two districts can be proved. Furthermore, we could also confirm that the areal unit might influence the numbers of the agricultural enterprises.

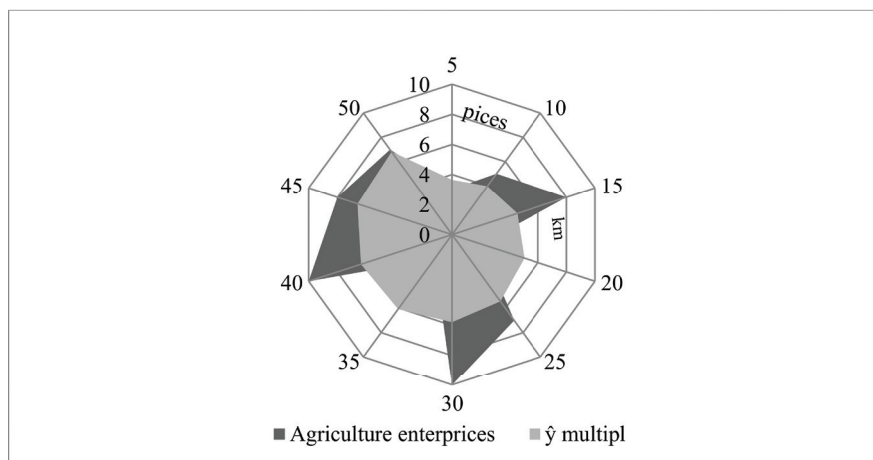
Table 1: Number and deviation examination of agricultural enterprises in Szigetköz

	Number of agricultural enterprises	Average	Deviation
Under-Szigetköz (n1)	18	2	1,1545
Over-Szigetköz (n2)	44	3,14	2,5314

Source: own searching

It could also be justified the fact that the number of agricultural enterprises in agglomeration of Győr decreased. (Figure 3.) Their activities are limited to crop growing (of course based on the given natural endowments), forest management, fresh water fish farming and related services, as well as horse keeping and breeding and related services.

Figure 3: The relationship between the location of the agrarian enterprises and the distance of these enterprises from Győr.



Source: own searching

Agricultural traditions and the culture of animal breeding are more visible in the settlements of the Mosonmagyaróvár district, we can see the farm animals (like poultry, cattle and pigs) and the remains of the former co-operations are still operating (in the forms of private limited liability company, ltd and co-operation).

Investigations outline a new type of tendency, which indicates that prosperity and agricultural activities serving weekend leisure (horse riding and fishing) start to spread in the villages of the agglomeration.

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