# DIGITIZATION IN RURAL SPACES – CHALLENGE AND/OR OPPORTUNITY?

## 3RD INTERNATIONAL SCIENTIFIC CONFERENCE ON RURAL DEVELOPMENT

Conference Proceedings

SZIE-AGK

**Szent István University Faculty of Agricultural and Economic Studies**

# DIGITIZATION IN RURAL SPACES – CHALLENGE AND/OR OPPORTUNITY?

# 3RD INTERNATIONAL SCIENTIFIC CONFERENCE ON RURAL DEVELOPMENT

Conference Proceedings

Editors:

Zoltán EGRI

Magdolna MOLNÁRNÉ KRAJCSOVICZ

Márta PARASZT

# CONTENTS

## INTRODUCTION

Infocommunication, digitization, automatization – these are standard calling words and phenomena in today's global economy. The Fourth Industrial Revolution creates new business model and jobs in all industries. But what do these dimensions mean for the European countryside? What will their impact be on the retention of rural population, employment, agricultural production, food economy and sustainable development?

The main aim of our conference was to provide practitioners, creators of rural development and representatives of scientific community with scientific tools and methods to practise common thinking and outline effective problem-solving methods.

The answers and solutions were outlined in five scientific sections of the 3rd International Science Conference on Rural Development.

We are proud that our conference has now grown into a Central and Eastern European event. Beside the local partners (Hungarian Academy of Sciences Regional Committee in Szeged, Logistics Working Committee, Government Office for Békés County, Hungarian Chamber of Agriculture Békés County Directorate, Hungarian Chamber of Hunters Branch of Békés County), several foreign universities participated in the organization of the conference and raised the scientific standards. The cooperation with lecturers and researchers from UTP University of Science and Technology (Bydgoszcz, Poland), University of Novi Sad (Serbia) and Banat's University of Agricultural Sciences and Veterinary Medicine is a significant opportunity to work together for our common future in the CEE region and in Europe.

We hope that our conference will continue to provide a forum for exploring and resolving the problems of the Central and Eastern European countryside.


Yours Sincerely,

the Editors

# IT SKILLS IN RURAL AREAS OF THE REGION WITH CASE STUDY

*ZORANOVIC Tihomir*

[1]University of Novi Sad, Faculty of Agriculture, Trg Dositeja Obradovica 8, 21000 Novi Sad, Serbia

## Introduction

One of the most important skills today is the ability to work on a computer. People who do not know how to work on a computer are significantly restricted in their work and can be considered illiterate today. During school, all students go through some form of teaching about Information technologies (IT) and working on computers. At all Colleges, computers are used as a standard tool of teaching and it is normal that students know how to work on them. Information and communication technologies (ICT) have evolved over the last 15 years and have become accessible to all. A large proportion of the population encountered computers in their middle years and adoption of a new skill is a great challenge. Company employees could not avoid computer literacy, but people in rural areas on their farms continued to resist new technologies for much longer. Research and analysis of official statistics should indicate the progress and current state of computer literacy and what skills the population possesses. Age and gender structure, income, infrastructure, etc. will be analyzed. Possession of IT skills implies that there are technical prerequisites such as owning a computer (or tablet), having a high-speed Internet connection, and possesses knowledge to working on a computer.

## Literature review

The problem with ICT education is that they are changing rapidly (Vranes, A., & Markovic, L., 2015). Technology is advancing so rapidly that it is thought that today's elementary school students will work in jobs that do not exist today. Some studies (Essays, UK) show that education in rural areas is at a lower level caused by low socio-economic factor, lack of facilities and resources, less qualified teachers etc. The number of graduate students from rural areas is lower than those in cities. An additional problem is that such educated students from the village stay in the city and don't return to the village (Nataša Gospić at al. 2014). Research on the current state of IT skills helps authorityes to come up with strategies for how to improve this problem in those areas (Vanja Erceg at all. 2019).

## Material and methods

The collected data were analyzed as indicators of the level of technical equipment, ie. computer ownership, the quality of the internet connection, the purposes for which the computer is used, the differences between women and men, and the comparison of IT in rural areas versus urban areas.
Data from statistical organizations (Eurostat, National Bureau of Statistics, etc.) and research results of other authors were used.
The research included Serbia and Serbia's seven neighboring countries (Bulgaria, Croatia, Hungary, Romania, Montenegro, North Macedonia, Bosnia and Herzegovina)

## Results

If we analyze the connection speed then it can be concluded that the difference between 10 years ago and now has decreased significantly. Today all countries have 68-83% coverage of their territory with the possibility of fast broadband internet (Figure 1).
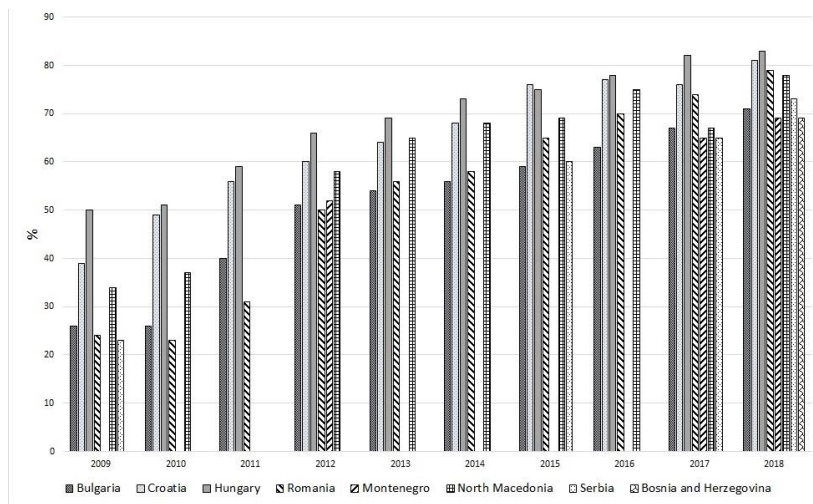


Figure 1. *Husehold internet connection type broadband*

The fact that in all countries over 70% of the population have an internet connection at home shows that the Internet is an indispensable part of everyday life (Figure 2).
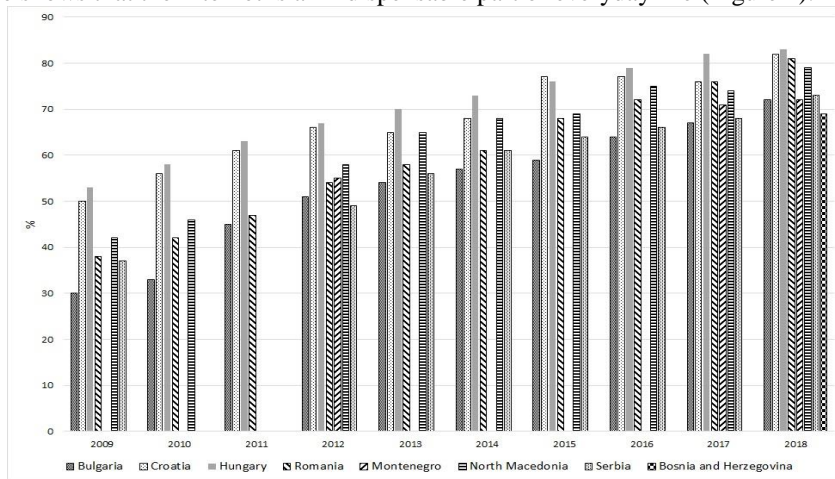


Figure 2. Percentage of households who have internet access at home

Internet access through wireless devices has increased from an average of 40% to about 60% in the last 5 years and doubled in some countries (Bulgaria, North Macedonia) (Figure 3).
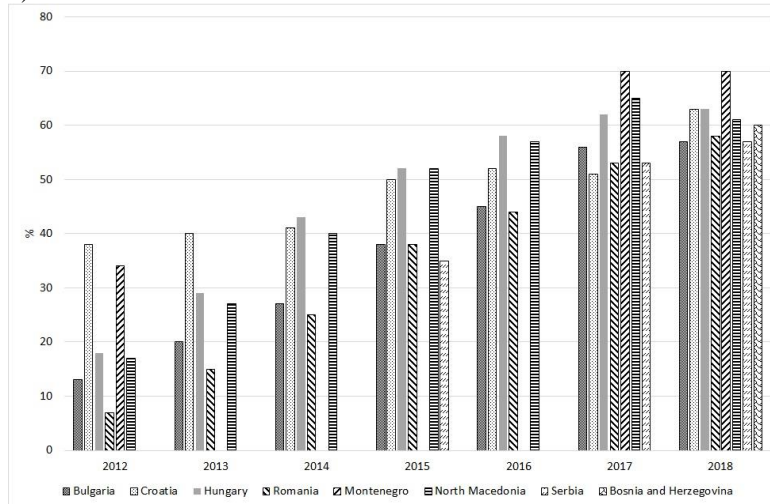


Figure 3. Individuals used a portable computer or a handheld device to access the internet away from home or work

(Figure 4), playing, downloading pictures, movies and music (30-42%), finding information about goods and services (Bulgaria 43% to Hungary 69%), for ordering goods or services (Montenegro 12%, Serbia 35%, Hungary 41%), for Internet banking (Montenegro 2%, Romania and Bulgaria 7%, Croatia and Hungary 41%) etc. The Internet is mainly used for participating in social networks
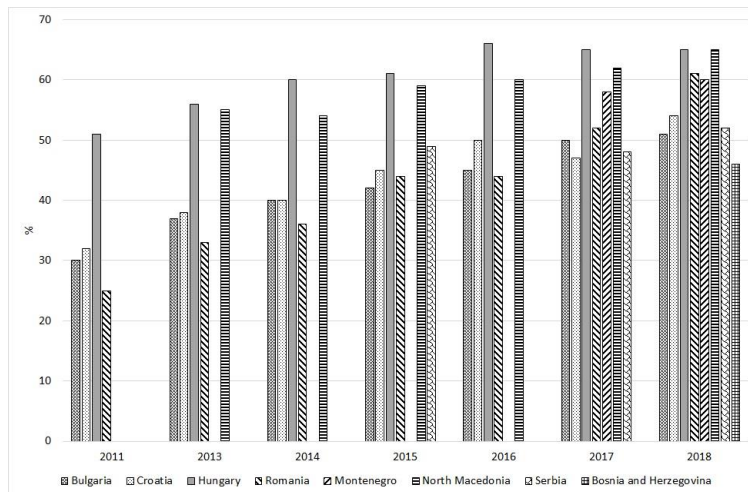


Figure 4. Internet use participating in social networks (creating user profile, posting messages)

The number of households that own a computer (85% in 2019, Figure 5) and an Internet connection (90% in 2019) is the largest in the Belgrade region. Rural areas have lower percentages in both of these categories (Figure 6 and Figure 7).
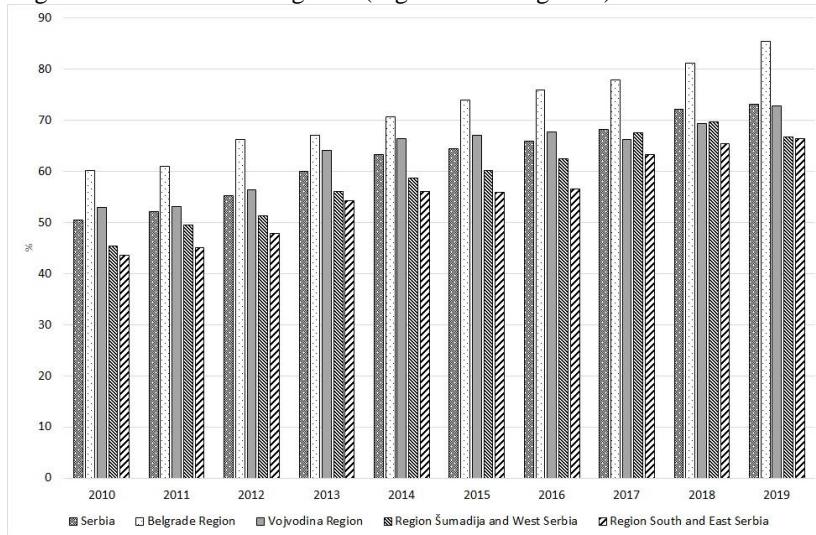


Figure 5. Households with computer in Serbia
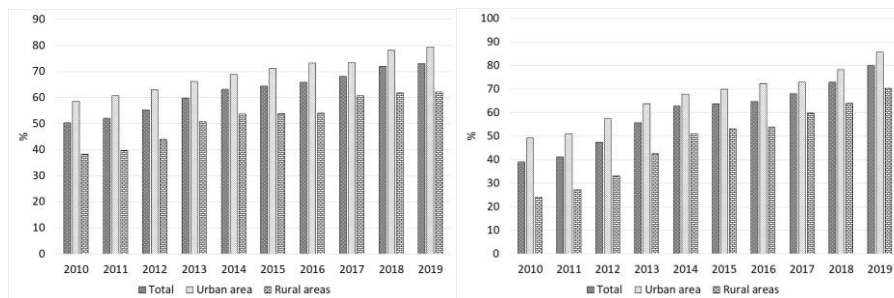


Figure 6. Serbia Households with Computer by Area   Figure 7. Serbia Households, Internet connection, Area

The monthly income directly affects the possession of a computer (Figure 8) and internet connection (Figure 9).
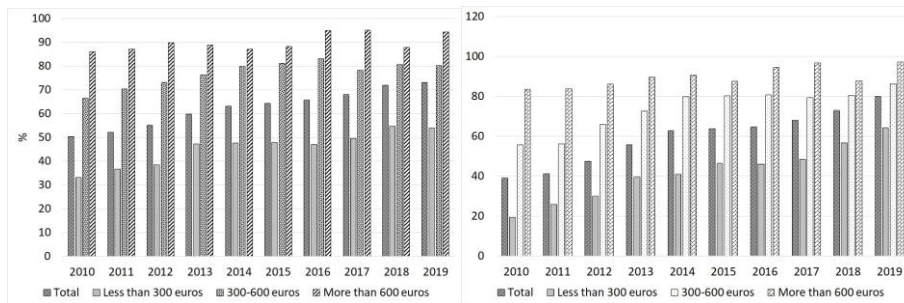
Figure 8. Serbia Households with Computer-Sallary Figure 9. Serbia Households, Internet connection-Sallary

In all regions, men are more computer literate than women (Figure 10) and women in urban areas are more computer literate than those in rural areas (Figure 11).
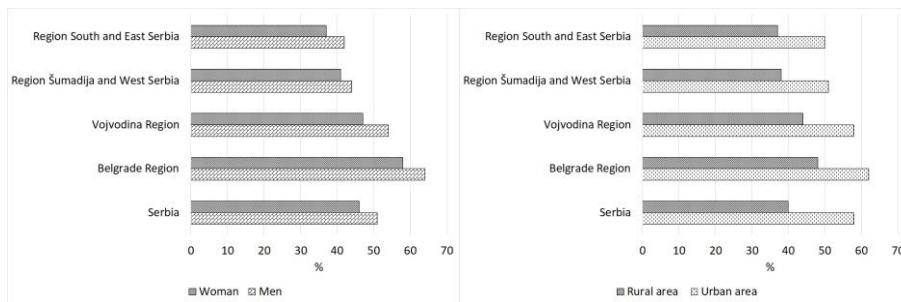


Figure 10. Informatical literacy by gender in Serbia / Figure 11. Informatical literacy woman in rural area in Serbia

By analyzing population by sex and age, it can be concluded that in the age of 16-24 years there was no difference in computer literacy between men and women and that the population of 25-50 years about 10% difference in favor of men.

Young people are the most active and literate and use computers daily (ages 6-24, 95.9%, 25-34 years, 90.6%, 35-44 years, 82.1%) and there is a clear decline in the older population (55-64 years, 52.3%, 65-74 years, 25.6%).

It is devastating that 22.8% of the population in Serbia never used a computer and 24.2% never use the Internet.

**Case Study**

Internet of Things (IoT) represents (most often wirelessly) the connection of objects, devices and other things with embedded electronics, software, sensors, actuators, all for the purpose of data exchange and device management. Single board computer, the size of a credit card, sets the basics for communicating the computer with the environment in a very simple way. Two workshops were organized to check if the IoT was interesting in rural areas. Two projects were selected, the control of temperature and humidity of the meat when drying the meat and the managing irrigation system. The system consisted of Raspberry Pi 3, temperature sensor DS18b20, DHT 22, relays, fans, electric

valves (Figure 12 and 13) and total cost is less than 100 euros. Projects have shown that curiosity and a desire for knowledge exist and workshops are highly attended.
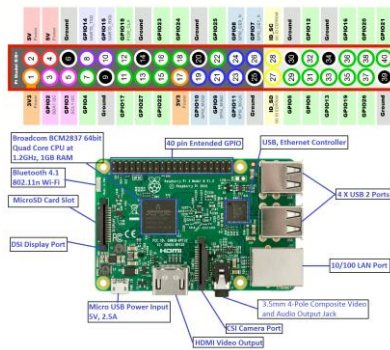


Figure 12. *Raspberry Pi 3 Model B*                    Figure 13. *Components used in the project*

## Conclusions

Differences in the technical prerequisites for computer and Internet access between Serbia and neighboring countries are narrowing and are now at around 10%.
Computer ownership and Internet access are directly related to household income as well as place of residence (lower incomes and rural areas have fewer computers).
Every day the younger (16-24years) population (over 90%) and the population 25 to 44 years (about 85%) use computer.
More than a half of the user computer used to access social networks, download movies and games, a lot less for electronic banking, shopping and payment over the Internet.
Men are more computer literate than women and women in the city are more computer literate than those in the rural area. This difference remains when comparing men and women with the same educational level.

## Summary

ICTs are evolving so fast that older generations have to make great efforts to accept it.
The first computer was made 75 years ago, became available to individuals 40 years ago, and nowadays, almost every household owned at least one in the home.
The Internet has been in use for about 30 years and that is the first choice when we are looking for something, when we are learning, when we are communicating with others.
A person who does not possess ICT skills is considered semi-literate.
This paper analyzes the technical prerequisites in the neighboring countries of Serbia in the ICT field. ICT skills by age, gender, education and place of residence were also analyzed for Serbia.
The results showed that the highest ICT skills are possessed by a man living in the city, with higher education, up to 40 years old.
At least ICT skills are available to women with lower education, over 50 years of age and residence in rural areas.

**Keywords:** ICT skills, Rural area, Internet connection, Education

**Literature**

VRANES, A., & MARKOVIC, L. (2015): Implementing information and communication technologies in educating knowledge workers. Qualitative & Quantitative Methods in Libraries, 4(4), 993–1003.

ESSAYS, UK. (November 2018). Students Performance In Rural And Urban Areas Education Essay. Retrieved from https://www.ukessays.com/essays/education/students-performance-in-rural-and-urban-areas-education-essay.php?vref=1

NATAŠA GOSPIĆ, DALIBOR PETROVIĆ, SVETLANA POPOV (2014): Istraživanje o ulozi znanja iz oblasti ikt i položaja žena na tržištu rada, http://www.e-jednakost.org.rs/site/projekti/2014/04/znanje-iz-ikt-i-polozaj-zena-na-trzistu-rada/

EUROSTAT (2019): eurostat.ec.europa.eu

REPUBLIČKI ZAVOD ZA STATISTIKU REPUBLIKE SRBIJE (2019): http://www.stat.gov.rs/

VANJA ERCEG, DUBRAVKA UŽAR, TIHOMIR ZORANOVIĆ, BRANISLAV VLAHOVIĆ (2019): State And Tendencies of the IT Applications in South-East Countries, 12th International Conference Association of Agricultural Economists of the Republic of Macedonia, Ohrid, North Macedonia.

# „SESSION IN AGRICULTURAL MANAGEMENT, AGRICULTURAL SUPPORT AND EMPLOYMENT"  1ST SECTION

# THE PUBLIC ADMINISTRATION SYSTEM IN THE CONSERVATION OF LANDSCAPE ELEMENTS

*Attila Rákóczi*

Szent István University – Faculty of Agricultural and Economics Studies, H-5540 Szarvas, Szabadság út. 1-3., rakoczi.attila@gk.szie.hu

## Introduction

Cumanian mounds are manmade formations that are the ancient cultural historical vestiges of the Carpathian Basin, which hold a great deal of valuable information (Barczi and Joó 2009). In Hungary Cumanian mound is the collective designation of various size and age prehistoric mounds that are artificial, anthropogenic formations, which are outstandingly significant from the aspect of archeology, botany, scenery and cultural history (Tóth 1999).

## Literature review

The cumanian mound's archeological and cultural historical value is shown by the fact that a significant portion of Cumanian mounds contain Copper Age and early Bronze Age burial sites, cemeteries from the Sarmatian, Germanic periods as well as the age of the Hungarian Conquest of the Carpathian Basin. (Csányi 2003). The outstanding botanical value of Cumanian mounds is that in an undisturbed condition they are very rich habitats and they are the last refuge of the increasingly rare steppe-flora (Sudnik-Wójcikowska and Moysiyenko 2008). They are also the carriers of scenery, geological and paleo-ecological values. The mounds are valuable from a geological aspect as well. They contribute to the detailed examination of the soils that were buried in the past and those that have been formed in past millennia (Alexandrovskiy 2000, Khoklova et al. 2001). The research mostly involved the chronological classification of the mounds, as well as the lifestyles of Copper Age and early Bronze Age populations (Ecsedy 1979). The agricultural disturbance of mound bodies (ploughing, removal) is the most damaging process from the aspect of their survival. Based on map sources it can be proven that originally tens of thousands of Cumanian mounds existed in the territory of Hungary (Virágh 1979), but by the middle of the 20th century their number considerably diminished, while their condition drastically deteriorated. Nowadays, when we walk around the Hungarian Great Plain we rarely see an intact mound, where we can be proud of its condition (Rákóczi és Barczi 2015). Throughout the centuries their number continuously diminished, primarily as a result of agricultural use and the reduction of their religious significance (Tóth 2002).
I studied the changes that occurred in the land use of the 185 Cumanian mounds included in the Good Agricultural and Environmental Conditions (GAEC) Decree, in Békés County, starting from the introduction of the Decree, meaning 2010, until 2015. I performed the research year after year by area surveys. The changes that occurred in the land use of the mounds as a result of the Decree are shown in Table 1.

The Table displays that never before seen improvement could be observed in the case of the Cumanian mounds included in the GAEC Decree. At the beginning of the study the farmers disturbed the area of 98 mounds, by 2015 this number was reduced to 8. After the introduction of the sanctioning system some cultivated mounds still remained, the primary reasons for this were problems related to undivided, shared ownership land areas, and the characteristics of the selection viewpoint system of the subsidy payout agency.

| num. | examined year | arable (pieces) | non-arable (pieces) |
|------|---------------|-----------------|---------------------|
| 1.   | 2010          | 98              | 87                  |
| 2.   | 2011          | 78              | 107                 |
| 3.   | 2012          | 40              | 145                 |
| 4.   | 2013          | 24              | 161                 |
| 5.   | 2014          | 11              | 174                 |
| 6.   | 2015          | 8               | 177                 |
| 7.   | 2018          | 5               | 180                 |

*Table 1*. The condition of Békés County's kurgans 2010 and 2015, and in 2018.
(1) number, (2) examined year, (3) kurgan pieces, (4) kurgan pieces

The empirical portion of my research concluded that the farmers are willing to work in the interest of protecting the mounds (Rákóczi and Barczi 2015). In 2018 I inspected the condition of the mounds in the County again, and I established that in the 3 years that had passed cultivation ceased in the case an additional 3 mounds, thus the number where cultivation had been abandoned grew to 180.

**Material and methods**

In my present study I analyze how the condition of the 185 Cumanian mounds included in the Decree has changed during the years that have passed since my doctoral thesis research, also considering the results of my 2018 inspections. In summary, I was searching for an answer to the question how well the Decree serving for the protection of the mounds is functioning nowadays. I performed this study by area surveys in the autumn of 2018 and in January 2019. I studied the 180 abandoned mound base population by *representative sampling* using a 10% sample rate. The compilation of representative samples occurred with a random number generator, by means of the program Random Number Generator Pro 1.71 (version: 1.71). I listed the mounds according to their unique identifiers (FÖMI identifier) in an increasing sequence, and assigned a serial number to them. By using the generator I selected the serial numbers of the mounds included in the sample, and the sample was completed based on the unique identifiers assigned to those. In the case of the 5 mounds registered as cultivated, I performed a *complete study*.

In recent years, the works related to the land registration of the mounds in the County have also started. Based on the data reporting provided by the Békés County Government Office I present the current status of the land registration process.

## Results

Of the 180 mounds registered as abandoned during my previous studies (2010-2015 and 2018), based on the selection, area surveys were conducted in the case of 18 mounds in 2019, the results of which are shown in Table 2.

| num. | result of generate | identification number | name of kurgan | status |
|------|------|------|------|------|
| 1. | 132 | 5 278 | Jukai-halom | non-cultivated |
| 2. | 2 | 1 062 | Vadaszán-domb | non-cultivated |
| 3. | 174 | 8 579 | Kolerás | non-cultivated |
| 4. | 177 | 8 576 | névtelen-halom | non-cultivated |
| 5. | 91 | 5 099 | névtelen-halom | non-cultivated |
| 6. | 102 | 5 181 | névtelen-halom | non-cultivated |
| 7. | 171 | 8 573 | névtelen-halom | non-cultivated |
| 8. | 126 | 1 564 | Vágott-halom | non-cultivated |
| 9. | 163 | 5 279 | Velki-halom | non-cultivated |
| 10. | 93 | 5 106 | Hármashatár-halom | non-cultivated |
| 11. | 10 | 1 083 | Gödény-halom | non-cultivated |
| 12. | 7 | 1 081 | Dinnyés-halom | non-cultivated |
| 13. | 58 | 1 448 | Földvári-dombok | non-cultivated |
| 14. | 181 | 8 583 | névtelen-halom | non-cultivated |
| 15. | 118 | 5 238 | névtelen-halom | non-cultivated |
| 16. | 138 | 6 220 | Hullató-halom | non-cultivated |
| 17. | 56 | 1 502 | Szappanos-halom | non-cultivated |
| 18. | 54 | 1 417 | Töviskes-halom | non-cultivated |

Table 2. The condition of earlier given up registered of 180 pieces kurgan
(1) number, (2) generated number, (3) kurgans identification number, (4) name of the kurgans, (5) status of the kurgans

It is shown that none of the previously abandoned mounds have been reintroduced into cultivation by the affected farmers.
The results of the 2019 area surveys of the mounds that were still registered as disturbed in 2018 are shown on Table 3.

| | identition | name of kurgan | status |
|------|------|------|------|
| 1. | 5 003 | Líviusz-halom | cultivated |
| 2. | 1 074 | Bódisné halma | cultivated |
| 3. | 5 259 | Vas-kapu-halom | cultivated |
| 4. | 5 264 | Mécses-halom | cultivated |
| 5. | 8 572 | Négyesi-domb | cultivated |

Table 3. The condition of earlier given up registered of 5 pieces kurgan in 2019
(1) number, (2) kurgans identification number, (4) name of the kurgans, (5) status of the kurgan

An important step of preserving our valuable landscape elements such as the kurgans (mounds) is to have them recorded into the official public register. The first recommendations of modern-day mound protection policies also mention registration as one of the first steps. Values recorded and contained in the land registers may cause some restriction concerning real estate sales as well as increases property value. It indeed increases as its normal real value is also registered therefore its existence becomes officially proved by the registers as well.

Its best example can well be demonstrated by registering NATURA2000 territories in the official public registers. The general introduction of that practice was not very popular among farmers because the term 'special protection area' became included on the property deed. However, compensation aids related to them have become even more popular and wide-spread. Today, it is taken as an advantage if an area is labelled as a special protection area. Mounds as landscape elements are considered as items for which compensation aids can be claimed since they are defined as ecological focus areas by CAP (2014-2020 budget cycle). For that reason, whoever farmer owns any mounds or other landscape elements on his property, no further areas of land are needed to be excluded from production, the areas are even eligible items to be claimed for normative aid.The results show that the 5 mounds previously registered as cultivated were still in disturbed condition in 2019. However, based on the results of the representative study, we can conclude that further mounds were not reintroduced into cultivation, thus the Decree and the applicable sanctioning system continually protects Békés County mounds effectively.

*Entering the mounds into land registries*
In the year 2017, at the Békés County Government Office the registration of the mounds recorded in the Békés County Agricultural Land Parcel Identification System into land registries commenced in Table 4.

| number | status of authority register | number of kurgan (piece) |
|---|---|---|
| 1. | under authority's administration | 180 |
| 2. | under authority's design plan | 0 |
| 3. | beginning of registration | 5 |
| **total** | | **185** |

Table 4. *The Békés county's kurgans in the property register*
(1) number, (2) status of register, (4) number

Reviewing the data of the tables we can establish that the land registrations guaranteeing the eternal preservation of Cumanian mounds have begun, and in the case of most mounds it has been completed. With this a long awaited and the earliest declared protection measure has been implemented. The sketches of Cumanian mounds entered into the land registry are shown in Figure 1.,2.,3.
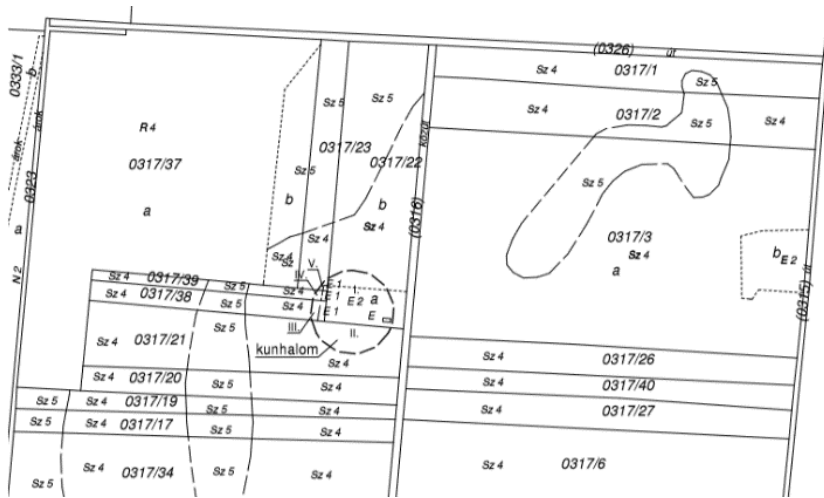
Figure 1. Kurgan in the public authority's design plan



Figure 2. Kurgan in the public authority's administration

Figure 3. The mound of Ördögégető (Ördögégető-halom)

**Conclusions**

The research shed light on the fact that the protection of Cumanian mounds is ensured for the long term by Hungarian and European Union laws. In summary, it can be concluded that the measures taken and the processes ongoing in the present point in the right direction from the aspect of Cumanian mound preservation. An important element of long-term sustainment is to have landscape elements recorded and contained in land registers.

**Summary**

In my present research I have, after three years, examined the state of the county mounds via field-walking in search of changes. The county government office has begun the entry of these mounds as landscape elements into the land registry. On the whole, we can determine that the present measures and processes will guarantee that the mounds will be preserved for posterity. This registering methods are absolutely advantage in other measures of nature conservation.

**Keywords:** common agricultural policy, nature conservation, landscape elements, kurgan

**Acknowledgement**

## Literature

A. Barczi – K. Joó (2009): The role of kurgans in the Palaeopedological and Palaeoecological reconstruction of the Hungarian Great Plain. Zeitschrift für Geomorphologie, Berlin-Stuttgart, Vol. 53: 131-137.

Alexandrovskiy, A. L. (2000): Holocen development of soils in response to environmental changes: the Novosvobodnaya archaeological site, North Caucasus. Catena, Vol. 41: 237-248.

Csányi M. (2003): Zwei Gräber aus dem frühbronzezeitlichen Gräberfeld von Nagyrév-Zsidóhalom In: Morgenrot der Kulturen. Raczky Archaeolingua 15, Budapest, 2003, p. 497-512.

Ecsedy I. (1979): The people of the pit-grave kurgans in Eastern Hungary. Fontes Archaeologici Hungariae, Akadémiai Kiadó, Bp., p. 148

Khoklova O., S. – Sedov S., N.– Golyeva A., A. – Khoklov A., A. (2001): Evolution of Chernozems in the Northern Caucasus, Russia during the second half of the Holocene: carbonate status of paleosols as a tool for paleoenvironmental reconstruction. Geoderma, 104 (2001): 115-133.

Rákóczi A. – Barczi A. (2015): A Körös-Maros Nemzeti Parkért Egyesület kunhalmok védelméért folytatott tevékenységének eredményei 20 év távlatából. Civil Szemle, XII. (2): 57–74.

Sudnik, B. - Wójcikowska, I. - Moysiyenko, I. (2008): The floristic differentiation of microhabitats within kurgans in desert steppe zone of Southern Ukraine. Acta Societatis Botanicorum Poloniae, Vol. 77., No. 2.: 139-147.

Tóth A. (2002): Az Alföld piramisai. Alföldkutatásért Alapítvány, Kisújszállás.

Virágh D. (1979): Cartographical data of the kurgans in the Tisza region. In: Ecsedy, I. (ed.): The people of the pit-grave kurgans in Eastern Hungary. Budapest, Akadémiai Kiadó. p. 117-148.

# WORKING METHODS OF THE GOVERNMENT OFFICE DEPARTMENT CARRYING OUT THE DELEGATED DUTY OF A PAYMENT AGENCY TO ASSIST SUCCESSFUL DRAWDOWN OF FUNDS IN RELATION TO THE RURAL DEVELOPMENT PROGRAMME

*Diána Magyarné KNAP – Mária SZAPPANOS – Sándor CSIKÓS*

Government Office of Békés County, Department of Agriculture and Rural Development, Békéscsaba, Temető sor 8., magyarne.diana@bekes.gov.hu

## Introduction

Similar to other EU countries, one of the most important results of the Rural Development Programme during its operation in Hungary is the network of institutions created on the different administrative and territorial levels along with their shared distribution of tasks and system of cooperation (BÍRÓ-NEMES). Duties related to agricultural supports were delegated to the sphere of competences for government offices as a consequence of restructuring the institutional background of the agricultural support system on 1st January 2017. The bodies carrying out delegated duties of a payment agency, namely the Departments of Agriculture and Rural Development operate in each county as well as in the capital as one of the departments of the government offices. The working methods applied by the special professional division of the Government Office of Békés County related to agricultural supports are in the focus of our study. In its operation, the principle of open office has always been considered as an objective from the beginning, through which it strives for creating a high-quality relationship with the clients, realising a cooperation providing aid in support procedures thus acts accordingly.

## Literature review

When establishing public administration tasks and spheres of activities, considering the clients' expectations, demands is a requirement that is as equal as professional aspects because official public activities shall be organised and implement not with power but rather as a service. Providing several factors simultaneously contributes to effectively achieve the aim in this case. These ones are primarily: - accessibility, plainness, - coherent organisation and implementation of tasks, - effectiveness (both in terms of financial and professional aspects), - client-oriented manner, - integrated performance of tasks (JÓZSA). Of office working methods, one of the factors of successfully drawing down supports is a tool also helping the openness of public administration, namely to enhance clients acquiring information in a way that is shall be applied along with professionalism, plainness and collaboration. To realise professionalism, it is needed to continuously update the related knowledge. Plainness is also an important element of information flow.

For them, the lack of professional language is a failure in performing duties thus might as well cause difficulties when drawing down supports and funds. That resulted in a

practice, through which the department staff keeps plain and simple solutions, and comprehensibility in mind when communicating with clients.

The government office has created a separate e-mail address for its agricultural department to receive enquiries in an electronic way, via e-mails from clients, and the head of the department provided guarantee of responding the questions within 24 hours. According to feedback coming from our clients, a further preferred working method of the government office as regards its agricultural department is that it operates the telephone helpdesk service in a call-back system. That was reasoned by several individual cases that could not be solved effectively and rapidly at the client service dealing with general and mass cases, however the quantity of average client service tasks on annual level did not make it necessary to add an extra staff member into the client service. Enquiries received periodically and in a rather hectic way (mostly connected to periods of submitting claims or performing payments) required constantly changing resources that could be adapted to different daily levels therefore we introduced a call-back system with the assistance of our staff members. Workload was thus reduced at the client service on the one hand, while instead of an indirect contact, a direct one was established between a staff member and a client on the other hand, due to which questions to be clarified decreased following discussions on the phone. The essence of the call-back system is that if there are any questions the call centre cannot answer immediately on the phone, we agree on a date for call-back and then a well-prepared professional will answer the problem/questions indicated formerly by the client. It is important to mention that call-back is with time guarantee, the client is called back within a day as a main rule, in special cases on a date agreed with the client.

One of the most crucial examples of commitment to help clients is the forum(s) organised for farmers by the government office's agricultural department, where theoretical knowledge and practical experiences facilitating the submission of different types of supports are shared, as a result of which the number of refusals can be potentially reduced. The event called Week of Thematic Agricultural Topics created in Békés county in 2018 continued to exist on a higher level in 2019 called Agricultural Thematic Series of Forums. Within the forum, the agricultural department presents important up-to-date lectures as regards its all spheres of activity in a different administration district per month. Such events also achieve distinct aims in accordance with the principle of open office: they help a lot for clients to get convinced that government office leaders can be contacted directly and are helpful, and that level of direct human relations between the clientele and the office is extremely important.

It is significant to highlight that the efficiency of investments supported by the Rural Development Programme is of key importance in our county. The termination of particular manufacturing capacities caused crisis for the whole branch. No structural change has emerged in animal breeding; pig, dairy cattle and poultry are typically bred according to the traditional way of farming (Kelle V. 2011).

Helping the drawdown of funds and supports effectively requires complex work from the office as well, correspondence and communication with professional bodies are of

key importance in the everyday work of the agricultural field. The frames of such relationships are declared in the form of cooperation agreements. Duties defined in such a way are accomplished very smoothly due to good relations having strong bases and mutual cooperation, and clients are in the focus of such agreements.

The government office's most effective and successful communication channel is the so called rapid information system (GYIR in Hungarian – gyorsinformációs rendszer) operating in the agricultural field, through which contact keeping is direct and rapid, immediate information related to each current topic can be provided directly for the clients and all professional bodies, cooperating partners. Anybody can register in this system and be included in its directory thus receiving weekly messages on every important deadline connected to the agricultural field, changing of laws, all useful information in its completeness are shared.

**Material and methods**

The research started with studying and processing the available literature. The secondary data of the research come from the databases of the following bodies: Hungarian State Treasury, Department of Agriculture and Rural Development (Government Office of Békés County). We have examined the efficiency of working methods at the department with analysing two sets of data, on the one hand the most important indicators showing the efficiency of the drawdown of funds, namely the grant amounts claimed for and paid have been analysed, on the other hand we have studied the response time spent on client enquiries received electronically. The method used was analysing and evaluating the data. Data was analysed with general methods applied for making analyses (comparison, percentage comparison). The period examined was the year 2018 and the first half of 2019, all the grant amounts claimed for and paid within that period for implementing any investment supported by the Rural Development Programme were examined. For the study, the experiences of work and knowledge acquired at the payment agency – as well as its legal successor – have been used. Data related to the statistics (response time of client enquiries) of the client service were defined with analysing client service data of the government office's agricultural department relevant for 2018 and the first half of 2019.

**Results and their evaluation**

The assessment and evaluation of grant amounts claimed for in the form of payment claims and the grant amounts actually paid in Békés county for the period of 2018-2019 indicate the following.

| Year of submission | Type of claim | Number of claims (no.) | Grant amount claimed for (HUF) | Grant amount paid (HUF) |
|---|---|---|---|---|
| 2018 | Payment claim | 286 | 3 639 264 631 | 3 228 496 330 |
| 2018 | Advance payment claim | 46 | 1 540 888 140 | 1 200 996 912 |
| Total | | 332 | 5 180 152 771 | 4 429 493 242 |
| 2019 | Payment claim | 194 | 3 456 545 493 | 1 322 896 423 |
| 2019 | Advance payment claim | 26 | 825 672 708 | 701 881 769 |
| Total | | 220 | 4 282 218 201 | 024 778 192 |

Figure 1: *Grant amounts claimed for and paid by the Rural Development Programme*

In 2018 the drawdown of funds reached the grant amounts claimed in nearly 89% as regards the submitted claims for payment, so was 78% as regards advance payments. When examining data for the first half of 2019, it is obvious that approximately two thirds of the number of claims for 2018 have already been submitted by 30th June 2019. In ratio examination furthermore, it can be said that payment was also higher considering that only half-year data are available in 2019 and cases in progress can relatively distort the results of the analysis because data can be seen in the claim, however payment was only following 30th June. Drawing down advances in 2019 provides us with a more exact picture and is definitely more successful than it was in 2018, it reaches 85%, while it was 78% in 2018 as mentioned above.

Besides data of payments, another sensitive field has also been examined connected to the Rural Development Programme, namely to what extent the 24-hour response guarantee for client enquiries received electronically (via e-mail) has been realised.

| Lead time of giving response | Enquiries responded indirectly (pieces) | Enquiries responded immediately and reasonably (pieces) | Ratio of reasonable responses as compared to the total number of enquiries (%) | It was needed to turn to other bodi(es) to give reasonable response (pieces) |
|---|---|---|---|---|
| Within 24 hours | 187 | 102 | 54,5 | 85 |
| Within 7 days | - | 41 | 22 | - |
| Beyond 7 days | - | 44 | 23,5 | - |

Figure 2: Breakdown of the 187 pieces of electronic enquiries received in 2018

| Lead time of giving response | Enquiries responded indirectly (pieces) | Enquiries responded immediately and reasonably (pieces) | Ratio of reasonable responses as compared to the total number of enquiries (%) | It was needed to turn to other bodi(es) to give reasonable response (pieces) |
|---|---|---|---|---|
| Within 24 hours | 112 | 55 | 49 | 57 |
| Within 7 days | - | 25 | 22 | - |
| Beyond 7 days | - | 32 | 29 | - |

Figure 3: Breakdown of the 112 pieces of electronic enquiries received in the first half of 2019

In 2018, our department received 187 e-mail enquiries. According to our observation, 100% of them were responded within 24 hours with 54,5% of questions in a reasonable and substantive way. 45,5% of enquirers received confirmation upon receiving the message as well as information within 24 hours that it is needed to turn to another body (payment agency) for receiving substantive reply. Seeing the results of the complete examination, it can be claimed that substantive responses within 7 days were forwarded to clients in 76,5% of the cases.

In 2019, there are only 112 enquiries received in the first half of the year, which have been responded in 71,4% within 7 days. Providing feedback from the office was also 100% within 24 hours, of which 49% received substantive responses.

**Conclusions**

Payments performed in the Rural Development Programme for 2018 and the first half of 2019 have been examined with statistical analyses. Following the analyses, we have concluded that drawdown of supports within the Rural Development Programme by local and regional farmers in the county is efficient, 89% of the grant amounts claimed for in 2018 were paid, while the ratio of withdrawn/refused grant amounts was solely 11% of the total claims. The examination gave us an interesting picture in the sense that for the 286 claims submitted in 2018 contained nearly similar amounts as it has been experienced in the 194 claims submitted in the first half of 2019. It is caused by the fact that for which actions are applied in the largest number and amount within the Rural Development Programme, e.g. for purchasing equipment in smaller amount or to finance large investments with more significant amounts.

Giving responses within 24 hours in 100% - even in cases when the question asked requires further professional consultation or resolution and the first response coming from the office is indirect and not substantive – is the proof of office rapid reaction and an indisputable human attitude of office administration works. It is important to note that it is not mechanised but colleagues in fact deal with each enquiry and if we are not entitled to give substantive response on county level due to the lack of scope, we immediately manage forwarding the enquiry to the relevant body having the right scope.

We have also found out that the percentage ratio of substantive response time within 7 days shall be increased – even if it does not concern an issue belonging to the scope of activities of the department –, a level of 85% has been deemed as a future aim to be reached next year. To realise that, it requires several further professional discussions with the payment agency and a stronger control on managerial level as time factor connected to responses is regarded.

**Summary**

Based on the presented working methods applied by the government office and the examinations of their impacts, strengthening the principles of open office and competent authority will increase client satisfaction. Cooperation with other bodies will confirm the strengthening of common aims thus effectively contribute to improve client satisfaction and successful way of the drawdown of funds.

People should be aware that the application of law by the government office is always seeking solutions, besides high level of professional knowledge, its staff members are

also expected to see the human side of their cases. An office will be legitimate and trustworthy if its clientele knows they can count on them, their professionals are prepared, rapid and correct. The aim of our working methods is that our clients know they can count on us and help effective drawdown of supports with several tools and ways.

**Keywords:** Rural Development Programme, open office, legitimate authority, communication, drawdown of funds, client service, Békés county, government office

### Literature

Bíró Szabolcs-Nemes Gusztáv: Vidékfejlesztési támogatások, lehívások, eredmények (Rural Development Supports, Drawdowns, Results), real.mtek.hu, downloaded on 01.09.2019.
Government Office of Békés County (BMKH-AVTF) Data retrieval 2018-2019: record of electronic client enquiries
Hungarian State Treasury data on payments and claims related to the Rural Development Programme 2018/2019
Józsa Zoltán: A hatósági ügyintézés, mint szolgáltatás (Authority Administration as a Service) 2016 p. 289.
Kelle V.: 2011. A támogatások és a likviditás összefüggéseinek vizsgálata a Békés Megyei mezőgazdasági
Vállalkozásokra (Studying Correlations of Supports and Liquidity as regards Békés County Agricultural Businesses) 4.

# THE USE OF DRONES IN PLANT PROTECTION
## (The legal conditions of the use of drones as plant protection machines)

*Zoltán BACSA*

Government Office of Békés County Békéscsaba District Office Agriculture Department Plant and Soil Protection Division, 5600 Békéscsaba, Szerdahelyi u. 2., bacsa.zoltan@bekes.gov.hu

## Introduction

”(…) legislative clean-up is urgent especially due to the regulations regarding spraying, as there are certain areas, where only parts need to be sprayed and not the whole area, and for that only drones would be suitable. (…)”– as one may read in an article of a professional portal. This is just one example that graphically illustrates how the use of drones in plant protection has started to become an essential part in precision agriculture. Therefore, it is increasingly pressing that legislation create the terms of legitimate use of drones as plant protection machines. The present study aims to point out by examining the current legal framework what the standards are of the use of a drone as plant protection machine, furthermore what issues are yet necessary to be clarified and regulated so that producers may legally use drones in agriculture.

## Literature Review

1. The Commission uses the terms unmanned aerial vehicles and unmanned aircraft systems in its Regulation (EU) 2019/947 of 24 May 2019 on the rules and procedures for the operation of unmanned aircraft (hereinafter Regulation No 2019/947), that are collectively referred to as ”UAS”. Regarding the use of UAS, regulation No 2019/947 regards the safety of persons on the ground and of other airspace users highly important. With this in mind it evaluates UAS operations from a risk-management aspect. In light of this, three operation categories are defined aligned to risk levels and other criteria. These categories are namely the”open”,”specific” and”certified”.

According to point B in Article 3 of Regulation No 2019/947:

”b) UAS operations in the 'specific' category shall require an operational authorisation issued by the competent authority pursuant to Article 12 or an authorisation received in accordance with Article 16, or, under circumstances defined in Article 5(5), a declaration to be made by a UAS operator;”

As in point f) in paragraph (1) of Article 4 of Regulation No 2019/947:

”Operations shall be classified as UAS operations in the 'open' category only where the following requirements are met:

(…)

According to paragraph (1) of Article 5 of Regulation No 2019/947:

” Where one of the requirements laid down in Article 4 or in Part A of the Annex is not met, a UAS operator shall be required to obtain an operational authorisation pursuant to Article 12 from the competent authority in the Member State where it is registered.”

As in paragraph (1) of Article 6 of Regulation No 2019/947:

„Operations shall be classified as UAS operations in the 'certified' category only where the following requirements are met:

a) the UAS is certified pursuant to points (a, (b) and (c) of paragraph 1 of Article 40 of Delegated Regulation (EU) 2019/945); and

b) the operation is conducted in any of the following conditions:

i. over assemblies of people;

ii. involves the transport of people;

iii. involves the carriage of dangerous goods, that may result in high risk for third parties in case of accident."

2. According to paragraph (3) of Article 1 of Government Decree No 4/1998. (I. 16) on the use of the Hungarian airspace (hereinafter GD 4/1998):

"Other than the designation of airspace for the use of the Hungarian airspace for transport purposes defined in the ministerial order, any use for aviation or other – not aviation – commercial use of airspace must be requested on occasion, for a specified period (hereinafter: temporary designated airspace)."

3. As in Paragraph (1), (2) of Article 9 of Directive 2009/128/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for Community action to achieve the sustainable use of pesticides (hereinafter Directive 2009/128/EC):

„(1) Member States shall ensure that aerial spraying is prohibited.

(2) By way of derogation from paragraph 1 aerial spraying may only be allowed in special cases provided the following conditions are met:

(…)

b) the pesticides used must be explicitly approved for aerial spraying by the Member State following a specific assessment addressing risks from aerial spraying;

c) the operator carrying out the aerial spraying must hold a certificate as referred to in Article 5(2). During the transitional period where certification systems are not yet in place, Member States may accept other evidence of sufficient knowledge;

d) the enterprise responsible for providing aerial spray applications shall be certified by a competent authority for authorising equipment and aircraft for aerial application of pesticides;

(…)

4. According to Paragraph d) of Article 4 of National Law No XLVI of 2008 on the national food chain and its supervising authority (hereinafter NFC.):

„Authority supervision of the food chain extends to the placing on the market and operation of plant protection machinery;"

According to point i) of Paragraph (1) of Article 60 of NFC:

„Plant protection penalty shall be imposed against a person who cannot provide marketing authorisation (type rating), furthermore did not undergo periodic review, or markets, operates or uses plant protection machinery that does not comply with standards;"

5. According to Paragraph 7 of Article (1) of Decree of the Ministry of Agriculture and Rural Development of 23 April No 43/2010 on plant protection activities (hereinafter MARD Decree 43/2010):

"plant protection machine: equipment used for the application of plant protection products, including any tools that are essential for the effective operation of such equipments"

According to Paragraph (2) of Article 5 of MARD Regulation 43/2010:

„Plant protection products shall be marketed and applied in compliance with the marketing and application authorisation licence (hereinafter: license), and with the label instructions concerning the prevention of risks to man and environment as well as the use and plant protection technology."

According to Paragraphs (1), (2) of Article 32 and Paragraphs (1), (2) of Article 34 of MARD Decree 43/2010:

"32. § (1) Plant protection machines with tanks larger than 5 dm3 – except for plant protection machines with examination, experimental or exhibition purposes – must undergo a type rating procedure as in Annex 3 from the aspect of droplet and spray technology before being placed on the market.

(2) Those plant protection machines that have international certification documents must be categorised administratively. The company responsible for production and distribution is obliged to declare to the Agricultural Machine Institute of the National Agricultural Research and Innovation Centre (hereinafter: Institute)that the plant protection machinery meet the marketing requirements specified in this regulation.

34. § (1) If as a result of the type certification procedure a plant protection machine does not meet the requirements pursuant to Article 32 § (1), the Institute will not issue the marketing authorisation, or will revoke any previously granted permissions.

(2) Pursuant to Article 32 § (1) the marketing of plant machinery that is not certified is prohibited."

6. According to points 2 and 5 of Paragraph (1) of Article 2 of Joint Order No 44/2005 (V. 6.) FVM-GKM-KvVM on aerial work in Agriculture and Forestry (hereinafter: Joint Order No 44/2005):

"2. Agricultural aircraft: a closed-cabin aircraft serving agricultural aviation with corresponding airworthiness certificate.

5. Aerial spraying: any form of application of plant protection products from aircraft."

According to Paragraph (1) of Article 3 of Joint Order No 44/2005:

"Flying for agricultural purposes shall be carried out by those with permission for aerial-agricultural services (hereinafter: aerial-agricultural permission) as in Annex 1."

According to Paragraphs (1) and (2) in Article 9 of Joint Order No 44/2005:

" (1) Agricultural aircraft shall only discharge authorised plant protection products and products with plant protecting effect that do not qualify as plant protection products.

(2) During agricultural flight products shall be discharged in accordance with the authorisation document.

**Substances and methods**

References to legislation quoted in the previous chapter may have seemed lengthy and dry to the reader. However, it should be noted that this legislative outlook only concerned main principles. Detailed rules covering the topic are much more extensive and comprehensive with particularities.

We need to start examining the issue of using drones for plant protection purposes – following the logic to legislative outlook – from a far-reaching perspective.

Recalling the EU rules one must see that Regulation 947/2019 of May 2019 that entered into force on a number of dates governs a more general use of drones. As one could read, the regulation categorises operations carried out by drones (UAS) into 3 categories as a result of a risk-based approach.

The least restrictive category is the"open". In this category it is criterion that only such operations may be carried out that do not involve the unmanned aerial vehicle transporting dangerous goods and it may not discharge and substances. It is my understanding subject to term definition that due to this criterion a possible aerial spraying as drone operation may not be classified in "open" category. By examining the strictest "subject to authorisation" category it may be concluded that there are such conditions that rule out a possible discharge of plant protection products. In my view, therefore, the discharge of plant protection products by drone falls in the "special" category in the Regulation No 947/2019 regulatory system. This also involves that the operator must obtain official authorisation and must make a VKM declaration prior to the operation.

After reviewing EU legislation on drones not only for agricultural purposes, Government Decree No 4/1998 must also be noted, as this regulation is still in force. According to its quoted provision for the use of Hungarian airspace – which includes the use of drones as well – air space must be requested on a case-by-case basis and prior authorisation shall be required. That is, according to the regulations in force, drones can only be taken into Hungarian air space – even for agricultural purposes – subject to an ad hoc airspace permit. It is assumed that by 2020 the EU legislation is expected to completely enter into force and the Hungarian legislation will phase out.

Approaching the regulation of the use of drones for discharging plant protection products, in relation to legislation one must get back to the EU level. Directive 2009/128/EC must be examined. According to the Directive aerial spraying is prohibited in the Member States. However, the regulation grants exemptions from the prohibition under certain conditions.

At this point it is worth mentioning that both the rule and the exceptions - which also appear in domestic legislation – are thought-provoking with regards to how plant protection treatment by the means of drones is assessed. The first and perhaps most important question is whether the application of plant protection products by drones is regarded as aerial spraying or considered ground handling. Having read the exceptions further dilemmas are formulated. Pesticides used for treatments must be authorised for the purposes of aerial spraying. Accordingly, some pesticides are already approved for aerial spraying, but it is questionable that is shall be deemed approved for drone air discharge, or a new licensing procedure must be initiated. To continue with further questions is the person in charge of the drone used for plant protection product application required to have a license, and if so, what kind. Furthermore, with regards to the drone is the type rating procedure to be conducted and what authorisation is issued for distribution and operation. Further analysis of the quoted references on legislation is in line with the aforementioned questions. The current domestic regulations on plant protection machines and aerial spraying also illustrate the questions that future legislation must address in order to use drones as plant protection machinery.

MARD Decree No 43/2010 defines the term 'plant protection machinery' which is to be interpreted in close connection with the definition of 'agricultural aircraft' as defined in Joint Decree No 44/2005.

If a drone is used to discharge plant protection products, it will be regarded as a plant protection machine. According to MARD Decree No 43/2010 plant protection machinery shall be subject to type rating procedure prior to the placing on the market. In theory, in the case of drones type rating procedures must be carried out, they shall not be placed on the market without.

It should be underlined that NFC law states that the official supervision of food chain also covers the trading and operation of plant protection machinery. If the competent authority observes infringement in connection with the marketing or operation of drones, it may issue fines.

For now, even the crucial question of whether drones used for plant protection product application are regarded as agricultural aircraft is not clear. According to the Joint Order No 44/2005 in force agricultural aircrafts are closed-cabin aircraft. This definition taken into consideration, it may be concluded that legislative amendment will be necessary for the use of drones as agricultural aircraft, since drones are not closed-cabin devices.

If drones will be treated as agricultural aircraft, then - considering the rules of the Joint Order No 44/2005 currently in force – it is yet to be regulated who may fly them and what permissions will be needed, since currently only those with relevant licences may perform agricultural flights.

As for the last aspect, the rules on plant protection products must be mentioned. MARD Decree No 43/2010 and the Joint Order No 44/2005 also contain rules concerning this. According to the regulations plant protection products may be used only as authorised, as specified in the license document. Only plant protects products authorised for aerial application may be applied by agricultural aircraft , as specified in the licence document

It is therefore clear that for carrying out either aerial or ground spraying by the use of drones, then presumably, under the scope of current regulations, re-licensing of plant protection products will be necessary, or the existing permit documents shall be amended.

**Results and conclusions**

The study followed the logic of first reviewing the regulatory cornerstones of the topic, citing existing EU and domestic legislation. In this round on the one hand it dealt with EU regulations regulating generally executable operations by drones, and then moved on to regulations in force regarding plant protection, plant protection machinery, air spraying and plant protection products.

Subsequently, the study – by analysing the cited legislation references - outlined what issues have already been regulated and what issues are still open and in need of regulation, or amendment to current regulation in force is required so that drones are to be lawfully used as plant protection machinery in agriculture.

On the basis of the above it shall be concluded that EU legislation in general gives a set of rules governing operations that may be carried out by drones.

However, the use of drones for the application and discharge of plant protection products is yet unregulated and raises legal, procedural issues that are to be addressed by legislative measures.

**Summary**

It can be concluded that precision agriculture have a strong interest in the use of drones as plant protection machinery. Manufacturers are constantly developing, experimenting, and farmers are open to the new device. However, one must admit that emerging issues need to be addressed; legislation in force should be reviewed, and amended as necessary so that drones shall be legally utilized as plant protection machinery.

**Keywords:** drone, plant protection, law, legislation

**Literature**

https://www.agrarszektor.hu/gepek/repulo-robotokkal-helyettesithetik-a-munkaerot-a-magyar-foldeken-jovore-elesedhet-az-uj-torveny.14391.html;

Commission Implementing Regulation (EU) 2019/947 of 24 May 2019 on the rules and procedures for the operation of unmanned aircraft;

Government Decree No 4/1998. (I. 16.) on the use of the Hungarian airspace;

Directive 2009/128/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for Community action to achieve the sustainable use of pesticides;

Law No XLVI of 2008 on the national food chain and its supervising authority;

MARD Regulation No 43/2010 (IV. 23.) on plant protecting activities;

FVM-GKM-KvVM Joint Order No 44/2005. (V. 6.) on aerial work in Agriculture and Forestry

# THE ROLE OF ROE DEER TROPHY EVALUATION IN THE GAME HUNTING ADMINISTRATION.

## The basis and context of trophy evaluation concerning the quality of deer population of békés county,

## Insight of the game hunting administration office on deer management in békés county in connection with trophy evaluation

*Antal VALKI*

Government Office of Békés County District Office of Békéscsaba
Department of Agriculture Division of Farming, 5600 Békéscsaba Szabolcs utca 34., valki.antal@bekes.gov.hu

### Introduction

"The word trophy originates from the Greek word 'trophaion', meaning a sign of victory. As a hunting trophy keepsakes are treasured and respected by the preparation and conservation of certain body parts of particular wild game of species …… The role and meaning of hunting trophies have changed over time, since nowadays they are not regarded as symbols of victory, but are treasured as memory by the help of which we may be able to recall dear hunting experiences" (Náhlik 2011, p288) The trophy of deer is the prepared antlers mount to cut small skull or full skull. It is every hunter's dream to be able to shoot and keep a game with capital trophy on their wall. The value of this memory is not only intangible, as the value of a trophy of a capital roebuck, which is also the value of the hunting experience, may be up to EUR 2500-3500. To come across antlers of such value as much as possible, deer management must be in place.

### Literature Overview and Presentation of Relating Legislation.

"The European roe deer (Capreolus capreolus) is a species of deer which has practically spread all over Europe reaching the lines of the Urals and the Volga ...In Hungary fawns are born from the middle of May to the middle of June,… Bucks shed their antlers and regrow them annually. The antlers of a buck fawn appear as two bumps at four months old. In November and December few centimetres long pedicels, so called calf antlers are grown that are lost in January, February and genuine antlers begin to grow. The second set of antlers may be tine, spiked, forked or six-pointer. From the point of antler quality the previous ones are undesirable, whereas the six-pointer represents good bloodline. (Author's note: bucks with forked antlers exceeding 15cms are to be in Békés County). These antlers are covered in velvet even in June, shredding starts late in November and December. The size of antlers in certain populations culminates at 5-6 years of age, and keeps the shape for a further 3-4 years. The lower part of old deer antlers are thick, the ends are thin. Decline begins after the age of 6-7 years. At the age of 1-2 years, the centre of gravity is in the top third part of the antlers, the tines are shorter and blunt.
Middle-aged bucks have evenly thick beams; the tines are long and sharp. In case of old bucks the"power goes down" to the bottom third of the antlers, branches become shorter, although remain sharp." (Náhlik 2011, p97-99) With this zoological knowledge

34

in mind we have a chance for conscious selection of roe deer. Trophy presentation, evaluation and comparison are part of the Hungarian hunting traditions, but it also appears in other nations at international level. "Initially the evaluation was carried out by sight, but certain measurement was considered in the trophy exhibition in Budapest in organised 1871. In 1896 on the occasion of the Millennium a large-scale trophy exhibition was organised in Vajdahunyad Castle specially constructed for the occasion in Városliget, Budapest. This was the first Europe-wide famous exhibition where some evaluation formula was used in the judgement of red deer trophy. The Nadler scoring formula was used since1927 and became known all around Europe. It was developed by Herbert Nadler hunting journalist, former director of the Central Zoo of Budapest… The Council of International Hunting and Game Protection (Conseil International de la Chasse et de la Conservation du Gibier, abbr. C.I.C.) took credit for developing scoring formulas and measurement methods applicable to the judgement of European large game… The perfecting of the system finished in September 1977, by which time all open questions were answered and proposals incorporated." (Náhlik 2011, p288) In Hungary, the C.I.C. scoring formula is currently used in trophy evaluation.



*Figure 1*. C.I.C. scoring table for hunting trophy evaluation.
(Náhlik 2011, p291)

It is to be mentioned that this scoring table does not take into account the age of the roebuck, and the professional manner of killing in terms of game management.In Hungary, in the course of trophy evaluation further data are recorded, such as the age of the buck, the classification of professional manner of killing, antler formulation (e.g.: asymmetric, fluctuating, uneven 8 point).

The Law No 55 of 1996 on game protection, wildlife management and hunting currently in force (hereinafter: Vtv.) states: "The Parliament, having recognized that all wildlife species are an irreplaceable part of the Earth's renewable natural resources and biological community, aware that they are the carriers of aesthetic, scientific, cultural, economic and genetic value, therefore – as treasure of our nation and the whole of humanity – should be preserved in the natural state for future generations.

for the protection of nature, the reasonable use of wildlife, creates the following law:"

This law No 55 of 1996 and the Ministry of Agriculture and Rural Development Regulation No 79/2004. (V. 4.) on game protection, wildlife management and hunting regulates in compliance with what rules may game farmers harvest game stock, like roes deer.

In order to have more valuable roe bucks population control and selection are required. "The aim of selection is not to create genetically superior wildlife. During selection shootings below average trophy-growing specimens are removed from to stock to 'make room' for specimens with really good trophy-growing potential, let them grow old waiting until the they put on the most beautiful, most valuable set of antlers." (Faragó 2007 p284-285) The Hungarian hunting traditions consider most desirable the regular six point buck with long stems and tines, and much weight in dark colour decorated with beads. Therefore the aim of selection is the sparing of these bucks until the age where further antler developing has culminated, but has not started to decline.



*Figure 2. Young six point buck in good condition. (Unprofessional killing)*
(Author's photograph)

Interestingly, the nominal value of the trophy and the hunt is only determined by the weight of the trophy as exact measurable value, furthermore that demand for special, possibly deformed antler developing bucks have grown lately regardless of the fact that under the law these bucks should be selected as young as possible.

In Hungary, in Békés County the following rules should be observed for roe buck hunting:

Paragraph (1) of Vtv. No 73 The persons eligible for hunting are obliged to present to the hunting authorities for trophy evaluation the trophies of red deer, fallow deer, roe deer as well as muflon shot by a hunter with hunting permit at latest within 30 days following the hunting season of trophy game. Paragraph (1) of Regulation Vhr. 76/A The evaluation of professional conduct is carried out taking into account the natural habitat of the region and the age of the game, on the basis of objective trophy measurements. The Regional Game Management Plan contains the definition of unprofessional killing by game species and by age.

(2) According to Paragraph (1) of Regulation Vtv. 74/A shooting a maximum middle-aged, regular trophy-developing specimen that is regarded outstanding quality in terms of measured trophy features defined in the Regional Game Management Plan of the place of shooting constitutes unprofessional killing.

(3) Unprofessional killing is classified by the following penalty points. Unprofessional killing may be

a) minor: 1 penalty points,

b) moderate: 2 penalty points,

c) severe: 3 penalty points.


If the game farmer does not comply with the rules, the following sanctions shall be applied:

(4) According to Paragraph (2) of Law No 74/A on game protection, game management and hunting it constitutes repeated unprofessional management of game with trophy in the particular hunting year, if the sum of penalty points received for unprofessional killing in the process of trophy evaluation– based on the specified number of killings of young or middle-aged trophy game species outlined in the Annual Game Management Plan – reaches 10% of the maximum given penalty points.

(5) If the penalty points received in trophy evaluation in a particular hunting year reach 10% of the definable penalty points, the eligible hunter is issued a warning for the professional harvesting of trophy game by the hunting authority.

(6) If in the two previous hunting years the hunting authority issued warning to the eligible hunter in at least one of the hunting years as set out in paragraph (5), and the penalty numbers received in the trophy evaluation reach 10% of the definable penalty points in the particular hunting year, the hunting authority will

a) issue a warning again in accordance with paragraph (5), and

b) specify restrictions regarding the concerned game species defined in paragraph (2) of Law No 74/A in the annual game management plan for the next hunting year.


Paragraph (2) of Law No 74/A If the hunting authority finds that the eligible carries out unprofessional management of trophy game practice repeatedly, depending on the unprofessional extent and frequency of repetition – the hunting authority draws the

attention of the eligible to comply with professional practice for the quality protection of big trophy game. If the eligible does not comply with the contents of the warning, the hunting authority orders weight limit trophy game restrictions in the hunting area – in case of mouflons the number of curls–, the violation of which will result in wildlife management fine.

**III. Az őzbakok szakszerűtlen elejtésének határértékei**

| Hibapont | Felrakás (bak kora) | Trófea tömeg legalább (g) | Ágak hossza legalább (cm) | Általános jelleg |
|---|---|---|---|---|
| 1 | 1. (1) | 160 | | tömegre való kritérium nélkül, ha 15 cm-es villás, tompa ágvég |
| | 2. (2) | 220 | 2 | szabályos hatos |
| | 3. (3) | 300 | 3 | szabályos hatos |
| | 4. (4) | 350 | 4 | szabályos hatos |
| | 5. (5) | 400 | 5 | szabályos hatos |
| 2 | 1. (1) | 250 | | tömegre való kritérium nélkül, ha 15 cm-es hatos, tompa ágvég |
| | 2. (2) | 330 | 3 | szabályos hatos |
| | 3. (3) | 380 | 4 | szabályos hatos |
| | 4. (4) | 430 | 5 | szabályos hatos |
| | 5. (5) | 480 | 5 | szabályos hatos |
| 3 | 1. (1) | 280 | | megadott tömeggel 15 cm-es hatos, tompa ágvég |
| | 2. (2) | 350 | 3 | szabályos hatos |
| | 3. (3) | 400 | 4 | szabályos hatos |
| | 4. (4) | 450 | 5 | szabályos hatos |
| | 5. (5) | 500 | 5 | szabályos hatos |

Table title (spanning): Az őzbakok szakszerűtlen elejtésének határértékei a 101. számú Tiszazugi, a 102. számú Maros-csongrádi, a 103. számú Békési, a 104. számú Szarvasi, a 105. számú Körös-berettyói, a 106. számú Nagykunsági, a 108. számú Hajdúsági Löszhát-Hortobágy valamint 112. számú Sárrét-bihari vadgazdálkodási tájegységekben.

*Figure 3.* Limit values of unprofessional killing of roebucks.
Regulation No 13/2018 (VII.3.) on the regional wildlife management plan of the Trans-Tisza Wildlife Management Landscape of the Ministry of Agriculture, Annex 4.)

**Recording and Managing Data of Trophy Evaluation**

Trophy evaluation is carried out by the hunting authorities upon request of the authorised hunter and recorded by the means of a purpose-designed programme. The results of the trophy evaluation are issued in a certificate. The evaluation sheet contains the measured  values, including C.I.C. point values, the measured weight, the weight corrected to the after 24 hours weight, after boiling of the small skull ("invoicing

weight" based on which the eligible will account with the ). Registered data will be transmitted in to a database. Each trophy is allocated a unique identification number which records the following:
Certificate
- A–hunting licence number
- B–hunting season permit (domestic)
- county code of the judging authority
- county code of the eligible to hunt
- year of hunting
- code of the species
- trophy number.

An example of a batch number: B161417V00022

The programme stores the data in a database, so statistical queries are possible. Furthermore, the complete database is sent to the National Game Management Database, where further queries and aggregation of national statistical data are made. (Parts of the data are public and available in the website of the NGMD).

The following queries are available to the hunting authority for the purpose of inspecting the roebuck management of the game farmers of the county in a particular hunting year:

- Harvest number, age in annual breakdown, trophy weight in 50 grams.
- Harvest percent in relation to the number of killed bucks, age in annual breakdown, trophy weight in 50 grams.
- Number of harvest in age annual breakdown (without trophy weight breakdown).
- Age distribution percent, age in annual breakdown (without trophy weight).
- Number of kills in age group breakdown (young, middle-aged, old).
- Harvest percent in relation to the number of killed bucks in age group breakdown.
- Number of awarded bucks (bronze, silver and gold).
- Award ratio in relation to the number of killed bucks.
- Number of incorrect killings classed as-1, -2, -3 breakdowns.
- Percent of incorrect killing in relation to the number of killed bucks.

In the alternative, other statistical data may be extracted; however this requires database management software.

**The use of the data**

These statistics are primarily used by the hunting authorities for the monitoring of roebuck management. Minimising the number of unprofessional killing is the most important, of course, as not only will this result in the deterioration of the population, but will also cause the loss of revenue later on as these developing hopeful young bucks are harvested prematurely. It is the vital interest of game farmers themselves to detect any problems with management in time. Data showing age ranges serve a more careful management, as several years of prior planning and producing even revenue may only be carried out in the case of an even age range distribution. Data may be accessed by

game farmers even during the year; authorities shall issue them upon request to facilitate professional work.

**Conclusions**

The year-on-year data collected allow the results to be recorded, and present the current status of the roebuck population. Trends may be defined based on these data. The impact of hunting activities on the game population may be reviewed ensuring the conditions for sustainable management. The authorities may have control over game farmers protecting the roe deer population from an undesirable overharvesting mismanagement. It offers more accurate data to the National Game Management Database than the Wildlife Assessment Report.

**Summary**

This lecture presents a short history of the origin of trophy evaluation and its significance in the currently applied evaluation practice. It points out how laws are to protect the Hungarian wildlife, narrowly taken the roe buck herd. It presents how and by what methods the hunting authority collects information on roe bucks harvested in Békés County. With this information it shows what options there are for the control of game management, and what feedback it can provide for game farmers.

**Keywords:** deer, trophy evaluation, Békés County, wildlife management

**Literature**

András Náhlik (2011): Vadászati ismeretek Dénes Natur Press
Sándor Faragó– András Náhlik (2007): Game Control, Mezőgazda Press
Law No 55 of 1996 on game protection, game management and hunting.
Regulation No 79/2004 (V.4.) on game protection and game management, and on the implementation of law No 55 of 1996 on hunting of the Ministry of Agriculture and Rural Development.
Regulation No 13/2018. (VII.3.) on the regional wildlife management plan of the Trans-Tisza Wildife Management Landscape of the Ministry of Agriculture
Legislation and Practice of the Official Hungarian Trophy Evaluation slides of the presentation of Imre Kovács, Gödöllő (2018)
Lists of the software supporting trophy evaluation.

# THE IMPACT OF HABITAT TRANSFORMATION ON WILDLIFE AND THE EXAMINATION OF OPTIONS TO MOVE FORWARD

*László FARKAS*

Branch of Békés County of the Hungarian National Hunting Chamber, e-mail: omvkbekes@globonet.hu

## Introduction

The presentation completely justifies the biological pattern according to which by improving and optimising environmental conditions, the habitat of game population and by professional game management even a less-favoured and inefficient hunting area may become one of the best.

In a relatively small hunting area (4.277 ha) there are no natural or artificial watercourses, lakes, streams, forests, reeds, all of which are necessary for game population to live well and in sufficient numbers in a particular area. High quality soil is a natural consequence of intensive farming in the area, which – as common knowledge – is not favourable to small game. So called 'large-scale farming' beginning in the middle of the 1970ies has simply turned the habitat of important wildlife species into 'culture desert'.

## Activities of Széchenyi Zsigmond Hunting Association Gerendás

The effectiveness of the Hunting Association and the hunting opportunities have deteriorated from year to year, while the workload put in to game management and the amount of subsidies continued to grow. In 1997 the idea emerged that in the name of the Hunting Association members and by support of the association smaller or larger strips of agricultural land are bought, which are then afforested and cultivated according to the needs of the game population to improve habitat conditions. The decision was followed by actions: in 12 years nearly 40 ha land was purchased by the company, in which area in 17 members afforestation and planting favourable for small game took place. The sometimes almost disastrous water shortage was tackled by 18 pipe well installations and water ponds. Food plots of the area were completely renovated and multiplied, 66 new mineral sites were prepared and 30 mobile water holes of 200 litres were purchased. In addition to their own land, the hunting association leases nearly 20 hectares of land, where they grow crops for the purpose of habitat improvement rather than hunting.

To describe our game population we can say that for over 20 years there have been no pheasants reared for hunting purposes released in our hunting areas, hunting is only for wild-born pheasants. Reared hen pheasants have been released in the area five times; partridges have been release twice, in all cases for the purpose of strengthening the natural population of the area. Within a relatively short period there was a spectacular rise in the quantity of game population and in parallel, in the recovery as well.

In the case of both deer and small game there has been approximately four-fold increase in the annual recovery and this recovery level is now steady.

Apart from the actual habitat conversion, the most important wildlife management duty is the continuous protection of the population of the desirable species from countless

damage-causing ones. It is completely natural, that in case of above average stock density of the desired species of game within a short time damage-causing will also appear making everyday life challenging for the wildlife manager. Armed defence against game damage is not as effective as trapping. It can be stated that sustained high numbers of small game can only be maintained, where professional hunters of the area conduct intensive trapping. The company has trapped nearly 1000 damage-causing game per year, but when this piece of data is compared to the former data of the world-famous Tótmegyer from the aspect of small game, then it is clear that they had six or eightfold annual harvest than us.

In addition to the continuous improvement of the habitat, the most important factor is the personality, competence, motivation, vocation and diligence of the hunting area manager, the professional hunter. Success is unthinkable without a good ranger; finding a good professional hunter is not easy, and if you manage to find such a colleague, then retention is important. The hunter association works with professionals with high level of expertise, who receive above average financial and moral recognition.

**The challenges and development opportunities of the hunting industry**

In the hunting industry, having reached a relatively high recovery level it is not easy to exceed it year-on-year, it is only possible with disproportionately more work, or even then it does not happen. Let us explore those challenges that are present every year as well as the newly emerging ones:

The main task is to provide the hunting area with water supply, as there is neither permanent, nor temporary watercourse, lake, irrigation channel, (etc.) in the areas, therefore providing the game population with water supply is completely the task of the association. This may be resolved by installing water holes and 200 litre watering barrels.

The other and bigger challenge is increasing the numbers of nesting sites for small game, which is the most important habitat development task for reproduction. Land lease proposals may be solutions, which may greatly contribute to sustaining the habitat. The two most damage-causing species are the wild boar and the golden jackal. In the case of both species the harmful effects to wildlife of their appearance in small game areas have not been recognised in many hunting areas. A publication of a national study on the correct application of methodology would provide a solution to this problem.

For decades the competent members of the hunters' society have been trying to sit down with representatives of nature and bird protection to discuss those issues. What happened to the former wetland paradise of Biharugra? –How much has the country's population of Great Bustards grown due to the effect of allocated subsidy amounts? Has it been successful to contain the reduction of the population of protected bird and mammal species caused by the overgrowth of wild boars and other damage-causing bird species within and around the territory of the National Park? – Are the rumours true about the release of micro-chipped big predators-bears, wolves?

– Is there a correlation between the population augmentation of the Eastern imperial eagle and the disappearance of hares?

– When will nature conservation give a guideline regarding the number of breeding pairs that are required of a particular protected bird species in the country? –

When will the actual number of these species be accurately assessed? –When will there be a developed national concept for protected predators, jackals, wild boars, for trapping, domestic cats slowly erasing the population of natural wild felines, for the reduction of wildlife damage caused by stray dogs, for the authorisation of thermal imaging and various acoustic equipment for professional hunters?

**Keywords:** hunting, habitat, game population

# THE PAST, PRESENT AND FUTURE OF THE EUROPEAN HARE IN BÉKÉS COUNTY

*Ferenc BOROS*

Hungarian Hunters' National Chamber Regional Branch of Békés County, Committee of Wildlife Protection, Wildlife Management and Education e-mail: omvkbekes@globonet.hu

"Glorious past, troubled present, uncertain future"

## Introduction

"The renowned 'nyúlstráf' hare hunting of Mezőhegyes, in the old days" description from the period of the last century:

"It is hard to do justice…

Either way, this was the last 'nyúlstráf' rabbitting of Mezőhegye where the take down of one day's worth of twenty one riflemen nearly reached two thousand. The renowned 'nyúlstráf' was not as famous as the one in Tótmegyer neither in the number record of take down, nor in the number of cartridges needed or the attending (selected) counts. According to Zsigmond Széchenyi the peak performance in Tótmegyer in 1933 was 11.851 hares for 9 rifles in a week-long hunt, using up 6000 rifle cartridges.

This means that one hunter shot 1300 hares in the course of 6 days, 220 a day.

In Mezőhegyes the known number of hare shot by the corner gunman in a rabbitting was 104 according to the chronicler, but this was not the hunting of the "court", so not in the best areas for rabbitting and not in the best hare year. In addition, hares did not turn to the corners in the soft snow.

Gyula Orosz hunting explorer shot 95 hares using 250 cartridges in the winter of 1943, which is a ratio of 1:2,6. But cartridges were military ones. Even though the hunting of Mezőhegyes did not reach the one in Tótmegyer in the number of take down, yet 'nyúlstráf' of Mezőhegyes never yet grew on trees, not to mention pheasant hunting. But the essence of the hunts of Mezőhegyes was not in the takedown, however much it was just calculated.

A well-managed social hunt has four important components:

-impeccable organisation ,

- hunter fellowship, that is attention without any downside, fun without offending one another

- good sport, body training actions, nature delights-nature protection,

- fair takedown.

This rank cannot be reversed, the order of importance cannot be changed, because then you will be missing out somewhere.

Beside the aforementioned ingredients the rest of the supplies – the equipment, the room and board, and the travel – are just by-things."

**The Natural Occurrence of Hares and Harvest**

The population of hares has reduced to its third since the 1960-ies. Its natural range is narrowing down more and more to the South Eastern part of the Great Plains. If this process continues, within two decades the population density throughout the whole country could reach the 4 animals/100 hectares threshold, at which level its hunting shall be suspended according to the regional plans.

The population size and the harvest of the hare show continuous decrease according to the diagrams. It is likely, that the natural population is overestimated. The estimated size of the population was 381.518 in the year 2017/18 according to the National Game Management Database (NGMD) (81.835), according to the NGMD data of the year 2017/18 the harvested number of hares was 74.294 (23.875), harvest rate approximately 19,5 (29) %.

Habitat Transformation

For the conservation of the stock habitat development is the most important. If this does not happen, lasting population growth may not be achieved. The large areas of grasslands or pastures are not favourable to the hare. The lack of continuous areas covered with plant in the large areas in the autumn period has a particularly bad effect (black fallow land). In addition, suitable habitats for hares are not bordered by rich lush vegetation. The situation is even more serious where connection among suitable areas for hares is inappropriate (ecological green corridors). Therefore, habitat development for hare is not usually done according to the needs of the species.

Agriculture

The intensive spread of agriculture and related adverse effects (labour force, speed, cultivation width of machines), as well as large scale tillage farming do not favour the preservation of the hare population.

Extreme Weather Conditions

The frequent weather extremes, droughts and overly wet periods, inland inundation, unusually mild winters or late frosts and snow experienced in the past decades all significantly decimate the hare population.

Mismanagement

Summer mortality of the possible autumn population may be up to 80% (summer feeding-fresh fodder). Planning and harvest are not carried out according to the estimate of population at the beginning of the hunting season, but are designed based on the estimation of population in February (design change as legislation allows is not carried out). Therefore, response to the changes in the population taking place in the spring-summer seasons of those eligible for hunting is often delayed. One of the reasons for the decrease in certain populations may be due to overharvesting.

Predator Control (all year round)

Thinning of predators has an effect on the size of hare population. If litters of the fox population are removed from the areas favourable to hares, the number of hares can be doubled. In other areas, however, the number of hares does not increase so dramatically. In fact, in areas where the hare population had doubled in the first year due to the efficient thinning of predators, in the second year there is no significant growth.

In the meantime, in the adjacent areas, where there had been less thinning of predators, the density of hares also grows, so the procedure certainly has positive effects, but the

primary reason for the drastic drop in the number of hares is not due to the proliferation of predators. The spreading of large game, diseases, and the survival rate of the first year's litter however, has an impact on the population number.

Aim of Population Control

The primary goal would be to maintain a stable and recoverable natural population in the long term, which could only be achieved in some areas by maintaining the number of population (it is only for a small area, and even just in small territories of it), but in most areas it could only be achieved by increasing the density. Unfortunately, it may be stated that even in the whole of small game areas there is no such natural population size that could allow for long-term harvest for eligible hunters in a self-sustaining manner.

Principles of Population Control

If those eligible for hunting would like to harvest hare, it can only be done under strong predator control, and with moderation. This means, that taking into account the current annual yield, the number of hunting and catching days must not threaten the population. In one part of area harvest is possible once a year only. Harvest is not allowed below 4/100 ha estimated spring population density. For the spring population the ideal density is 10-15 hares/100 ha, that allows for small possibility of the population collapsing by means of disease, and it sufficiently encourages reproduction. In the management of hare population the introduction and application of adaptable and wise harvest management is necessary.

Capture or Shot Hare Use

The means of management is primarily influenced by the existing natural population, its size and location within an area. The application of a method for estimating the population number (estimate by using thermal camera is suggested, but using night time reflectors may also be suitable) should be made mandatory at the end of winter and in early spring and autumn, prior to the hunting seasons.

Tasks for Habitat Improvement

In game management habitat improvement favourable to this species is priority, where land management favourable to the species may be carried out, furthermore continuous water supply in suitable quantity and quality to hare must be provided. Areas dominated by small-plot farming, sowing structure allowing for diversity (proportion of legumes within an area) and grasslands, forest patches and forests in alternation provide optimal habitat for the European hare. Creating hides, ecological green corridors connecting uncultivated edges of land that interweave the whole area.

Predator Management

Continuous and intensive predator control in the whole of hunting areas is priority, with particular attention to furry pests. With regards to damage to game in small game areas according to the raptor-life programme), where protected species of raptors prey on substantial amount of hares, wild game farmers should be compensated for the loss of income, which should be spent to maintain the pheasant population.

**Keywords:** rabbit, change of population, hunting, utilization

# DAMAGE CAUSED TO NATURE AND WILDLIFE BY HUMAN ACTIVITIES

*Tibor ZUBERECZ*

Békés County Territorial Unit of the Hungarian National Chamber of Hunters, e-mail: omvkbekes@globonet.hu

**Introduction**

Today our earth is endangered by the problem of overcrowding, people are restructuring the environment at an increasing rate. Our home country, Hungary including Békés county within that is not an exclusion. Of course, if Hungary is mentioned, we do not need to think of that large nature and environment pollution like the ones in China or the USA, however there are destructive activities everywhere, which might be avoided with small-scale care and caution. In my presentation, I will talk about and depict such most typical phenomena because results cannot and should not (only) be reached by strictly keeping the rules of law but by a conscious awareness-raising activity.

**Relation between human and nature**

1.Burning
Such an activity can be carried out outdoors exclusively with the permission of the Environment and Fire Protection Authority, it is utterly forbidden to burn resistant vegetation (e.g. reed) or stubble fields (except for some cases of viruses or fungal infections), the activity covers solely mown vegetation. Burning shall be implemented in a way that harm can neither be made to the fauna nor the environmental conditions. It is especially important in the spring season because dry vegetation from the previous year provides shelter and nestling place for numerous protected as well as unprotected birds (mammal species). Fire left carelessly aside will often cause irreparable damage.

2.Fertilisers, treated seeds, unauthorised pesticides
Each performance enhancer and chemical is to be used solely according to the prescriptions, in the opposite case the irresponsible ones must reckon with their crime of damaging nature. Paragraph 245 of the Civil Code declares that our environment is a protected legal object, the common value of all. The saying is true for both forestry and farming: 'medicine' is healing in small quantities but poison in larger quantities.
Rodenticides such as Redentin RB are to be mentioned separately, however this drug is unauthorised in the EU because of its chlorophacinone content, it is sometimes (vis major) marketed and used. Despite the rigorous rules on land application (only flight management, prohibition on the use of rolling disc, etc.), we are informed on a significant number of wild game (especially brown hare and roe deer) mortality.

3.Groundworks, harvesting
In order to increase productivity and due to a relative lack of labour force, equipment and machines with higher and higher capacities are used even in agriculture.
Soil treatment machines with large working widths, harvesting machines/vehicles and mowing machines are extremely dangerous. Although in particular nature reserves

47

(Natura 2000, Agricultural Environment Economy, special territory of national value) it is mandatory to use alarming fence of chains against wild game to reduce/avoid damage. It would be useful to introduce and use them in non-protected areas thus decreasing losses caused inevitably for animals living/nestling on the ground.

4.The topic of water supply

Hungary is an agrarian country, Békés county represents a flagship within the country's agrarian field. One of the most urgent problems today is the question of water supply (due to the unfavourable changes of weather conditions). Therefore the government of Hungary in the future (because of crop safety) intends to extend the area of irrigable lands from a grant amount of 17 billion HUF (in our county that would all mean an extension of irrigable lands from 5% to 10%). Water from the large rivers is transported to the place of usage through irrigation systems. The problem is that for avoiding leakage detection, embankment is provided for watercourses with concrete panels, rubber covers and polyethylene sheeting. It is true for each solution that they become algaefied within a particular period of time thus will be extremely slippery. At (or under) certain filling levels of river beds, game seeking for water and getting into the canals will irresistibly die. That is why it is extremely important to authorise the building of new watercourses in the future in a way that the technical design documentation shall include environment friendly technologies in advance, which fundamentally excludes/solves the problem.

The status of already existing canals and watercourses should then be reviewed. If and when possible, it is to be monitored that they shall be completed with additional game saving steps or bars, which can moderate/cease damage already caused for the game.

5.Ploughing of routes, alleys, boundaries, overexploitation

As a result of a profit-oriented attitude becoming dominant recently, forest lanes, alleys, ruderal areas edging agricultural fields are disappearing in larger and larger quantities. Unfortunately, there is no strong controlling power related to that, however adverse possession/overexploitation often occurs. That means a problem because the majority of wildlife lives in these areas, e.g. species diversity can hardly occur in the middle of a corn field of one hundred hectares. A solution would be for instance to assign the payment of subsidies for land cultivation to the size of land used legally. Based on the survey conducted recently by the National Association of Forestry, it can be claimed that half of the woody species planted within the Great Plain Afforestation Programme (1950-60s) is missing.

6.Illegal dumping (disposal of waste)

The quality of natural habitats still existing is further destroyed by disposing municipal waste illegally there, although such an activity has been considered as a crime since 18th March 2019. Moreover, nature and environment protection/forestry guarding fines can be imposed on perpetrators.

Harmful substances can remain in the environment as well as be accumulated in human beings (as end consumers) significantly even for centuries.

7.The topic of stray animals

One of the most neuralgic points between animal rights activists and those in charge of responsible nature protection is the question of stray animals. According to the president of the White Cross Animal Protection League, in Hungary there are:

- roughly 100 thousand stray dogs, the majority of them living in residential areas, the minority of them in nature,
- approximately 3000 dog attacks on annual level in Hungary,
- approximately 1 million cats living without owners, the majority (90%) of which does hunt effectively thus causing quite great damage amidst tiny songbirds.

Both species are cross-compatible with their wild relatives (wolf, wild cat) that unintentionally contributes to genetically destroy the original species.

The Civil Code declares that: 'whoever keeps an animal and it causes any damage to anybody, the owner is in charge of that damage as well as obliged to take care of placing and caring of the animal and prevent it from escaping.' Note: on behalf of that Law LV of 1996 and its implementation decree allow the person with hunting permission to capture/hunt dogs, cats chasing the games to protect wild populations.

8.Game-vehicle collisions

Except for motorways (where fences are set up to protect vehicles), animals and vehicles can accidentally encounter anywhere at any time. The rate has indeed increased in the past 20 years because the fleet of vehicles has doubled (3 million cars), the road network has grown by 30% in that period. If there is still an unfortunate accident, paragraph 6/539 of the Civil Code shall be applied on the encounter of hazardous items throughout claims management, which declares that in the absence of default made by any parties, both of them are liable for their own damage caused. Collision is considered as a road traffic accident therefore police and the territorially competent person in charge of legal hunting must be called to manage any disputes emerging later on, game is not allowed to be taken; it is the property of Hungary if alive, and to be possessed by the person in charge of legal hunting if dead.

The hunting value of dead animals is not compensated while damage caused to the vehicle is managed by the insurance company, in case having a complementary insurance or motor casco insurance. It would be a working solution if complementary insurance related to the current case – as in Slovakia – was integrated – for a higher price – into the compulsory liability insurance.

**Keywords:** nature, hunting and its related services, damage caused in game

**Literature**

Law LV of 1996 on the protection of game and hunting and its related services
Law V of  2013 on the Civil Code

# „SESSION IN AGRICULTURAL MANAGEMENT, AGRICULTURAL SUPPORT AND EMPLOYMENT" 2ND SECTION

# SUSTAINABLE DEVELOPMENT THROUGH EDUCATION

*Andrea FEHER* [1]

[1]Banat University of Agricultural Sciences and Veterinary Medicine "King Michael 1st of Romania" from Timisoara, 119 Calea Aradului, 300645, Timisoara, Romania, feherandrea.usab@gmail.com

## Introduction

Sustainable development means that development which satisfies the needs of the present without the detriment to the potential of next generations to fulfil their own needs (World Commission on Environment and Development, 1987).

The concept of sustainable development has undergone continuous changes over the years, reaching nowadays to state that the main objective of sustainable development is to find relevant correlations between systems (economic, social, technological, environmental) (Ciolac et al., 2019), emphasizing, increasingly, on intelligent development, based on education and innovation.

The states that allocate the highest costs for education and research are also those whose economy is based on innovative products and which have an accelerated growth rate (McGuirk et al., 2015). Therefore, education and innovation are the primary factors driving sustainable growth (Feher, 2014).

## Literature

Education leads to growth and jobs and helps to improve employability, productivity, innovation and competiveness (UN, 2015).

Education is an important objective formulated in the 2030 Agenda for Sustainable Development (UN, 2015).

The objectives of the European Union regarding education as a basis for the development of a smart and sustainable economy are set at SDG4 ( Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all). The targets broaden the scope of education as a global project to encompass outcomes in literacy, numeracy, and wider learning including global citizenship, sustainability and gender equality (Unterhalter, 2019).

Education is also a precondition for achieving many other Sustainable Development Goals (SDGs) (UN, 2015).

Educational issues appear in a number of other SDG targets, including SDG3 on good health and wellbeing, SDG 5 on gender equality and women's empowerment, and SDG8 on decent work (Feher, 2019). While it is acknowledged that in some SDGs the education components and connections could be better articulated (Nillson, 2016), the SDG framework has been read as offering something for everyone working on education (UNESCO, 2016).

## Material and methods

The starting point for the research results presented in this article is a statistical analysis of the level of development of each country, expressed by the statistical indicator GDP/capita, the expenses allocated for education and higher education expressed as a

percentage of GDP, and the number of universities in each analysed country which are among the top universities in Europe.

Statistical indicators are real numbers, which synthesize part of the information contained in a set of values, giving the possibility of global appreciation of the whole series, instead of taking into account each value in the string (Rujescu, 2015; Raicov et al., 2018).

Minimal and Maximal are indicators that indicate the value range of the value series. Minimal is the smallest value in the series, and Maximal is the highest.

Average is the indicator that shows the central trend of the value series, and usually shows where the data tend to clutter. Often, the values in the series are mostly near the average, and a smaller part of them are located to the left or right of the media.

To show the existing correlation between the evolution of GDP/capita (as a form of expression of economic development) and the expenses allocated to education at the level of the analysed countries, on the one hand, and the relation between the expenses allocated to education and the hierarchy of universities (which expresses the recognition of the educational act) we used the calculation of the PEARSON correlation coefficients.

The bivariate Pearson Correlation produces a sample correlation coefficient (*r*), which measures the strength and direction of linear relationships between pairs of continuous variables (Băneş, 2018; Rujescu, 2015).

**Results**

In Figure 1 we have presented the average value of Gross Domestic Product / capita of the years 2014-2018. Real GDP/capita is a measure of economic activity and is also used as a proxy for the development in a country's material living standards (Feher et al., 2017, Eurostat, 2019). It is calculated as the ratio of real GDP to the average population of a specific year.
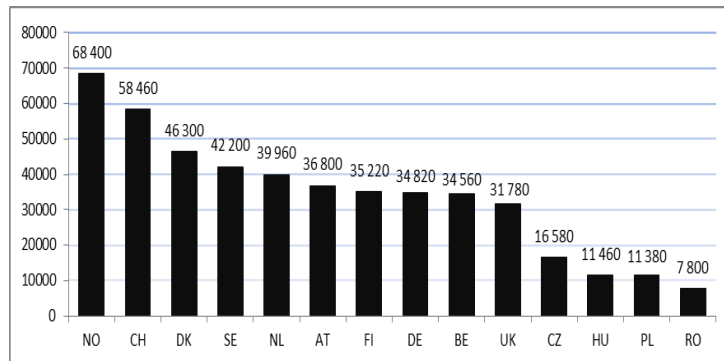


Figure 1. *Real GDP per capita (EUR/capita, the average value of the years 2014-2018)*
Source: Based on Eurostat [sdg_08_10]

The lowest values of the indicator are found in the Nordic countries, Norway having an average GDP/capita of 68,400 Euros in the period 2014-2018, Switzerland 58,460

Euros, Denmark 46,300 Euros. The value of the indicator decreases as we move to Eastern European countries. In countries where GDP/capita is highest, the standard of living of the population is significantly higher.

Considering the scale of the countries taken for analysis, the ratio between Romania (last country) and Norway (the first on the scale considering the value of GDP/capita) is 1: 8.7. This directly affects the quality of life, including the level of education in each country, as a premise for sustainable development.

Another indicator analysed in the article concerns the financial support of the education system in the countries taken for the study, expressed as a weight that is allocated to education from Gross Domestic Product. The situation is presented in Figure 2, and the values reflect the average of the years 2012-2016.

Unfortunately, the education system in Romania benefits from the weakest financial support in all analysed countries. The same situation is found in the case of supporting research and development (Figure 3). Hungary allocates 1.5 times more capital to education, the Netherlands two times more, Denmark and Norway nearly three times more money to education than Romania. This directly affects both the physical conditions for carrying out educational and research activities in school units and the qualitative level of the educational act. The correlation will also be supported by presenting the number of universities in these countries that are in the European ranking of prestigious universities.
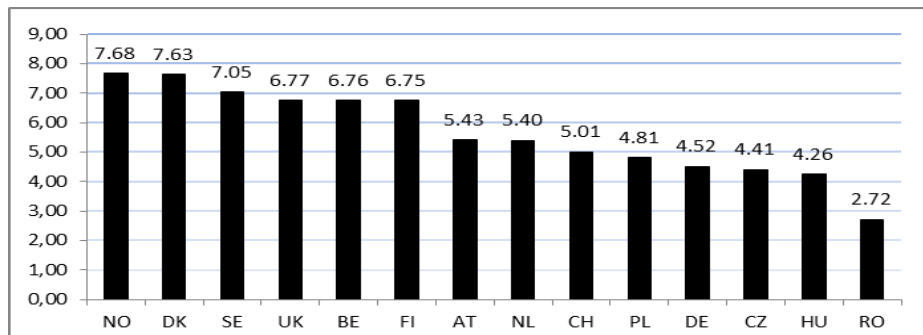


Figure 2. The share of GDP allocated for education in several European countries
Source: Based on Eurostat, [educ_uoe_fini01] and [nama_10_gdp]
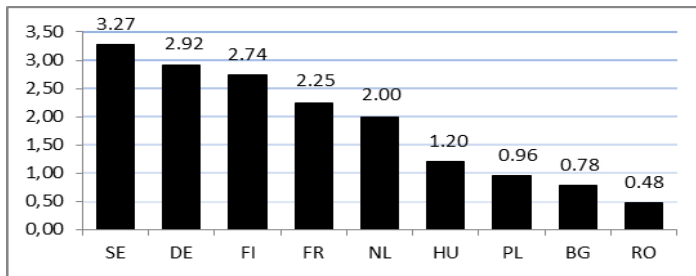
Figure 3. The share of GDP allocated for research and development in several European countries
Source: Based on Eurostat, [rd_e_gerdtot] and [nama_10_gdp]

If we refer strictly to the tertiary education, the support of this form of education is shown in Figure 4, expressed as the weight allocated from the Gross Domestic Product.
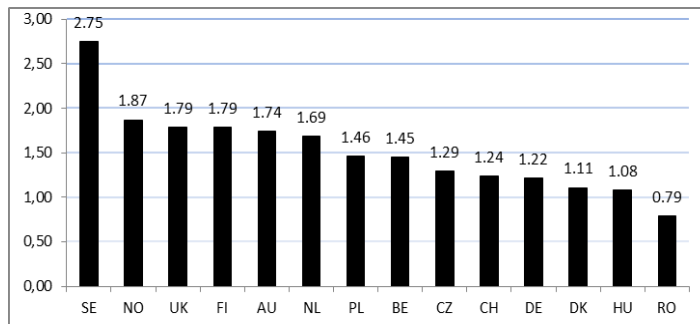


Figure 4. The share of expenditure on tertiary education from GDP in several European countries
Source: Based on Eurostat, [educ_uoe_fini01] and [nama_10_gdp]

The country that allocates the most money to higher education is Sweden, 2.75% of GDP, followed by Norway with 1.87% of GDP, United Kingdom 1.79%, and last in the group of countries analysed we find Romania, with a support of tertiary education of only 0.79% of the GDP.
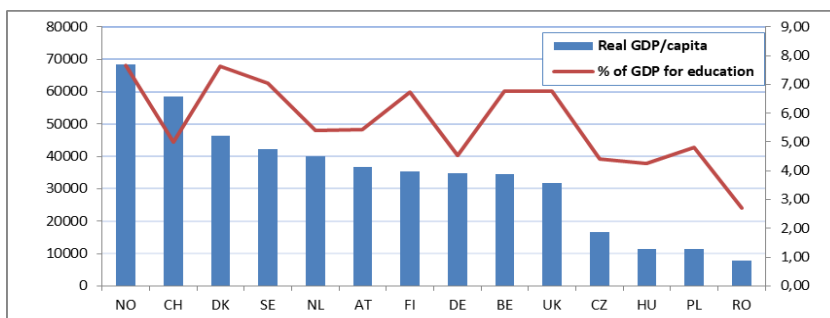


Figure 5. The relationship between GDP/capita and share of expenditure allocated for education from GDP
Source: Own elaboration based on Eurostat data

For analysis the relationship between real GDP/capita and share of expenditure allocated for education we used the PEARSON correlation coefficient (Table 1).

The bivariate Pearson Correlation produces a sample correlation coefficient (r), which measures the strength and direction of linear relationships between pairs of continuous variables. The Pearson's "r" for the correlation between the Real GDP/capita (VAR01) and share of GDP for education (VAR02) in our example is 0.694. When Pearson's "r" is close to 1 this means that there is a strong relationship between the two variables. So, education is a main factor that determines the evolution and size of Gross Domestic Product, and, finally, the sustainable development of a country. Also, when Pearson's "r" is positive (+) this means that as one variable increases in value, the second variable also increase in value. Similarly, as one variable decreases in value, the second variable also decreases in value.

Regarding the Sig (2-Tailed) if the value is less than or equal to 0.05 (the value is 0.006 in our case), we can conclude that there is a statistically significant correlations between the two variables.

|  |  | **VAR02**<br>**% of GDP**<br>**for education** | **VAR01**<br>**Real**<br>**GDP/capita** |
|---|---|---|---|
| VAR02 | Pearson Correlation (r) | 1 | 0.694 |
|  | Sig. (2-tailed) | - | 0.006 |
|  | N | 14 | 14 |
| VAR01 | Pearson Correlation (r) | 0.694 | 1 |
|  | Sig. (2-tailed) | 0.006 | - |
|  | N | 14 | 14 |

Table 1. Pearson correlation coefficients

In Figure 6 we show the distribution by country of the universities in the European rankings - top 100, 200, 500, and 1000. Thus, United Kingdom has seven universities in the top 100 universities in Europe, Germany, Netherlands and Sweden have three universities in the top 100, Belgium and Denmark two universities, Finland and Norway each one university in the top 100, the rest of the countries do not have university in this ranking. At the level of the first mentioned countries we observe an increased number of universities in the top 200, 500 and 1000.

The universities in the top 100, 200 and even 500 come generally from small and medium-sized European countries, which have an obvious qualitative and quantitative critical mass, in which over 6% of GDP is allocated for education and research and 1.5-2.8 % for higher education (Otiman, 2019).

Regarding the ranking of the Romanian universities internationally, this is totally unsatisfactory. Out of a total of 95 universities (56 state universities and 39 private universities, at the level of 2017) (Eurostat, 2019), in Romania only two universities are in the European ranking. These are the University of Bucharest and the Babes-Bolyai University of Cluj-Napoca. The rest of the universities do not meet the qualitative (regarding the educational and research activity) and / or quantitative criteria regarding the number of students in order to be included in the ranking of the prestigious universities.
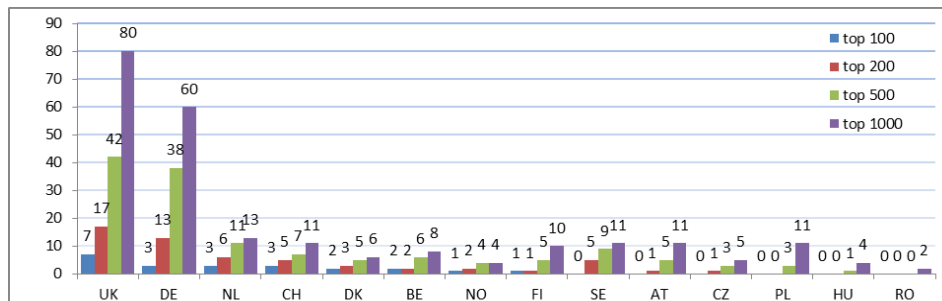
Figure 6. Distribution by country of the universities in European rankings - Top 100, 200, 5000, 1000
Source: Based on https://www.webometrics.info

The Pearson correlation coefficient (r) between supporting education from GDP and top 100 universities is relatively low (r = 0.287), reflecting an insufficient correlation between the two variables. As a result, the education system in a country must be adjusted and supported both financially and through the adoption of viable policy decisions that will ensure increased performance in the educational system.

Of course, the bad situation of educational system from Romania is the result of an inadequate financial support from the public budget and the lack of a clear medium and long term strategy, but this situation is also due to other negative structural factors faced by the universities, namely:

-a small number of students (about 5,000-6,000 students on average at a university and 400-500 staff, compared to 35,000-40,000 students and 4,000-4,500 staff at the top universities);

-high share of costs related to non-academic staff;

-the defective structure of the expenditures destined to the actual education process, where the share of personnel expenses exceeds 50%, and the part that belongs to the actual academic process (equipment, consumables, documentation-information, depreciation) is extremely low (Băneș, 2015, Otiman, 2019 ).

**Conclusions**

Education is one of the main factors that influence the level of development of a country, both economically, socially and culturally.

Continuing education after the basic level is important because people with higher qualifications are more likely to be employed and less likely to face poverty in a knowledge-based economy. Therefore, investing efficiently in education and training systems that deliver high-quality and up-to-date services lays the foundation for a country's prosperity.

The Pearson correlation coefficient (r) between the real GDP/capita (VAR01) and share of GDP for education (VAR02) for our study is 0.694, which again underlines the close correlation between the allocation of funds for education and research and the level of development from a country. Also, regarding the Sig (2-Tailed) which value is 0.006 in

our case emphasizes that there is a statistically significant correlations between the two variables.

The countries that allocate the most capital for education are Norway, Denmark, Sweden, United Kingdom, Belgium, Finland (over 6.7% of GDP). The share of GDP allocated for education in Romania is only 2.7. This directly affects both the physical conditions for carrying out educational and research activities in school units and the qualitative level of the educational act.

The Pearson correlation coefficient (r) between supporting education from GDP and top 100 universities is relatively low (r = 0.287), reflecting an insufficient correlation between the two variables. As a result, the education system in a country must be adjusted and supported both financially and through the adoption of viable policy decisions that will ensure increased performance in the educational system.

### Summary

The main objective of the article is to present the level of education in some selected countries, and to explain how education determines a sustainable growth. Education is the main factor to achieve both economic and employment growth. At the same time, education plays an important role for a sustainable improvement of the standard of living in the world. Supporting education is also one of the aims of the 2030 Agenda for Sustainable Development (Goal 4), but education appears in a number of other SDG targets too. The countries that allocate the most capital for education are Norway, Denmark, Sweden, United Kingdom, Belgium, Finland (over 6.7% of GDP). The share of GDP allocated for education in Romania is only 2.7. This directly affects both the physical conditions for carrying out educational and research activities in school units and the qualitative level of the educational act.

The Pearson correlation coefficient (r) between the real GDP/capita (VAR01) and share of GDP for education (VAR02) for our study is 0.694, which again underlines the close correlation between the allocation of funds for education and research and the level of development from a country. The Pearson correlation coefficient (r) between supporting education from GDP and top 100 universities is relatively low (r = 0.287), reflecting an insufficient correlation between the two variables. As a result, the education system in a country must be adjusted and supported both financially and through the adoption of viable policy decisions that will ensure increased performance in the educational system.

### Literature

BĂNEȘ, A.-ORBOI, M.D.-LILE, R.-MERCE, I. (2015): Requirements of students for further integration on labor market. International Journal of Learning and Teaching. 7(2):50-55.

BĂNEȘ, A.-GOȘA, V.-IANCU, T.-ORBOI, M.D. (2018): Analysis of the Influence of Investments in Tourism Accommodation in Romania, Proceedings of the international conference of life science, USAB Timisoara

CIOLAC, R.-ADAMOV, T.-IANCU, T.-POPESCU, G.-LILE, R.-RUJESCU, C.-MARIN, D. (2019): Agritourism – A Sustainable Development Factor for Improving the 'Health' of Rural Settlements. Case Study Apuseni Mountains Area. Sustainability, 11(5), 1467 doi:10.3390/su11051467

EUROSTAT ONLINE DATABASE. https://ec.europa.eu/eurostat/data/database. [sdg_08_10], [nama_10_gdp], [educ_uoe_fini01], [rd_e_gerdtot]

FEHER, A. (2014): Development opportunities of rural entrepreneurship by participating in training projects. Research Journal of Agricultural Science 46(4): 46-51

FEHER, A.-GOȘA, V.-RAICOV. M.-HARANGUȘ, D.-CONDEA, B.V. (2017): Convergence of Romanian and Europe Union agriculture - evolution and prospective assessment. Land Use Policy, vol. 67:670-678

FEHER, A.A.-SÎRBULESCU, C.E.-PAȘCALĂU, R.-GOȘA, V.-RAICOV, M. (2019): Quality education for all: an investigation of the European Union context using 2030 Agenda indicators, Lucrări Științifice Management Agricol, vol. 21(2): 112-119

MCGUIRK. H.-LENIHAN, H.-HART, M. (2015): Measuring the impact of innovative human capital on small firms' propensity to innovate. Research Policy, vol. 44 (4):965-976

NILLSON, M.-GRIGGS, D.-VISBECK, M. (2016): Map the Interactions between Sustainable Development Goals, Nature, 534(7607): 320-323

OTIMAN, P.I. (2019): Metropolitan University (comprehensive) – the university of the future in Romania. Academica, XXIX, vol. 6-7: 124-130

RAICOV, M.-RUJESCU, C.I.-FEHER, A.-MERCE, I.(2018): The determination and ranking of factors bearing an influence over the ability to absorb rural development funds in Timis County, Romania. AIP Conference Proceedings, ISSN: 978-0-7354-1538-6, Vol. 1978, article number: UNSP 390006-1; doi: 10.1063/1.5043990

RUJESCU, C. (2015): Mathematical statistics, ArtPress, Timisoara

UNTERHALTER, E. (2019): The Many Meanings of Quality Education: Politics of Targets and Indicators in SDG4. Global Policy, vol. 10, Supplement 1, pp. 39-51

UN (UNITED NATION) (2015): Sustainable Development Goals, United Nations, New York, USA. Available at: https://www.un.org/sustainabledevelopment/sustainable-development-goals/ (accessed on 23/07/2019)

UN (UNITED NATION) (2015):Transforming our world. The 2030 Agenda for Sustainable Development, A/RES/70/L.1. Resolution adopted by the General Assembly. United Nations, New York, USA. Available at: https://sustainabledevelopment.un.org/post2015/ transformingourworld/ publication (accessed on 23/07/2019)

UNESCO (2016): Education for People and Planet. Global Education Monitoring Report, Paris, UNESCO

WORLD COMMISSION ON ENVIRONMENT AND DEVELOPMENT (WCED) (1987): Our Common Future. Available at: https://sustainabledevelopment.un.org/content/documents/5987our-common-future.pdf (accessed on 10/08/2019)

# „SUSTAINABLE" LOCAL AGRICULTURE IN AN INDUSTRY-ORIENTED COUNTRY

*Árpád DUCZON[1]*

[1] [1]University of Pécs Faculty of Business and Economics, Doctoral School of Business Administration 7622 Pécs Rákóczi út 80., arpad.duczon@gmail.com

## Introduction

In my paper I will focus on the possible development of the agriculture sector in a mostly industry and services-based world. Hungary decided to upgrade its automobile industry in order to connect the country into the global economic system. Using an American theory of Pisano and Shih, here I would like to show the Hungarian governments policy on reaching that goal. Although it targets the automobile industry the government also helps the agricultural sector as well.

In this paper, I chose a town in Tolna county. The example of Zomba can become a case study to understand the missing role of the industrial commons and give survival "strategy" to anyone. Relying on local traditions and measuring regional economic trends should help to maintain the agricultural sector in rural Hungary.

## A valuable resource

Through the examination of profitability indicators, my goal is to answer a general question: Is the land a valuable resource? A resource is valuable if it is difficult to copy, durable, appropriable, difficult to substitute, and better than that of the competitors'. (Collis and Montogomery, 1995).

I argue that land can easily fulfill the first four conditions. There is currently no technology available to replace or imitate high-quality lands. The history of mankind is persistently linked to this durable, renewable resource. Where it can be assumed that private property is protected by the state, the profits generated on the land may be appropriated. The only remaining condition is that land should be a more valuable resource than its competitors. In this sense, land's competitors may be other activities that can be carried out by a settlement. If human and material resources can be better exploited, more value is created, like by utilizing another valuable resource, such as a local tourist attraction, then a shift of strategic focus could be useful or indeed, necessary.

## Industrial commons

In Pisano and Shih (2012) industrial commons refer to the critical mass of suppliers, buyers and skilled labour in a geographic area. While Porter (1993) emphasized their competition in the first place, Pisano and Shih (2012) demonstrated the symbiotic relationship between these economic operators within the industrial commons.

These commons are created by being the most logical gameplay theory step of competitors when they enter the market: settling somewhere near the centre of the existing competitor's supplier network. This attracts additional suppliers and skilled labour to the area, sooner or later the universities and the relevant infrastructure serving

the common will emerge. An essential feature of industrial commons is that all economic players benefit from their existence, for example by the availability of greater human resources, the movement of which between the companies will facilitate the spread of knowledge. The emergence of industrial commons is a self-strengthening process (Pisano - Shih, 2012) and their existence in the 21st century is due to the very fact that transport costs are not zero (Jacks et al., 2008), cross-border trade has to face a great deal of legal, administrative and cultural issues and the mobility of labour is relatively low, thus moving it, for example to China, is unfeasible. The automobile industry is Hungary's most famous and prospering sector, which requires functional "industrial commons". In my previous studies I have already showed many of this theme, like the Slovakian and Hungarian automobile commons (Duczon 2019a). Following the change of regime, several car factories have been established in Hungary. This include Opel (Szentgotthárd) and Suzuki(Esztergom), followed by Audi (Győr), Mercedez-Benz (Kecskemét) and most recently BMW (Debrecen). From the number of factories, it is easy to see that Hungary has become a favourable location for the automotive industry because over the years a serious system of suppliers has been established. This began the development of industrial commons, which later became a self-accelerating, productive process. The Hungarian government have made multiple step to improve the country's industrial potential, like promotion the new Mercedes factory in Kecskemét and the BMW factory in Debrecen. The government allocated different types of resources into the automobile industrial commons like giving financial support to foreign companies, providing educated workforce in certain geographical locations and available educational system. Creating such industrial policy put a question to the experts about its significance on local development. Many of them describes this process as a desertification or in other words taking any oxygen from one's territory.

**The economic background of Tolna county**

I chose to study the viability of agriculture by conducting a study of an agricultural village. My choice fell to Zomba, which is located within Tolna County, in the district of Bonyhád.
Zomba is a typical agricultural village. Tourism is not particularly strong in here, or in its extended area i.e. in the Bonyhad district and Tolna County. These two factors together mean that the profitability of agriculture is crucial to Zomba. If it is not supported by the relevant data, the initial investment and time needed to shift strategical focus in this county would be one of the highest.
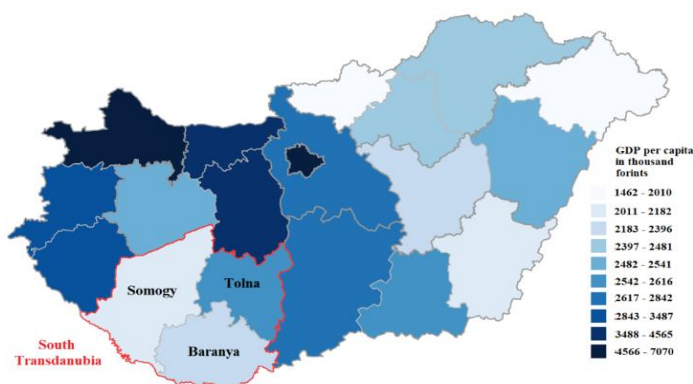
*Figure 1. Per capita gross domestic product per county, in 2016.*
Source: Central Statistical Office (2018a): Gross Domestic Product Per Capita (GDP / Person), 2016.

Table 1 shows the gross domestic product per capita in 2016 per county. It is easy to see in the figure that the eastern and south-western counties of the country are among the poorest. Tolna County, however, occupies the 8th place among counties with 2.57 million forints per gross domestic product. By comparison, the other two counties in the region, Baranya and Somogy, have similar data of 2.18 million and 2.13 million, and occupy the 15th and 16th places of the counties respectively.

|  | Baranya | Tolna | Somogy | National average |
|---|---|---|---|---|
| **Agriculture** | 9.3% | 10.4% | 11.1% | 7.3% |
| **Industry** | 24.5% | 42.0% | 23.5% | 39.1% |
| **Services** | 66.2% | 47.6% | 65.4% | 53.6% |

Table 1. *Added value of the counties of the Southern Transdanubian region by sector.*
Source: Central Statistical Office (2019): Gross Domestic Product Per Capita (GDP / Person), 2016.

Table 3 shows that the added value of the service sector (47.6%) in Tolna County is lower than the national average (53.6%). While in all three counties of Southern Transdanubia the weight of agriculture is higher than the national average, in Tolna County, due to higher industrial performance, the distribution of added value is different.

As far as Tolna's agriculture is concerned, the cultivation of plants is decisive, while the weight of livestock production in the sector is negligible. 89% of the agricultural area is arable land, the highest in Hungary among the counties. The cultivation of grain within the county is dominant within the cultivation of plants: grain was grown on 72.9% of the harvested area in 2016 (Central Statistical Office, 2018b).

Zomba does not reflect the general dominance of industry in Tolna as seen in Table 3. Figure 3 shows that 65 percent of the total turnover of the 54 enterprises registered in Zomba was accounted for companies pursuing their activities in agriculture.

Similarly to Tolna county, the contribution of the service sector is lower, however, unlike in Tolna county, in Zomba, not the industry, but the predominance of agriculture explains the phenomenon.

At the beginning of this chapter, I made two statements that I wanted to confirm with relevant data. The first claim was that Zomba was basically an agricultural town. To assess this, I have mapped the structure of the economy of the whole country and Tolna County, and as a result, I have shown that Zomba has a strong agricultural dominance as compared to both the county and country. The second claim was that tourism in Tolna County was relatively weak. The national data supported this claim well, both through the number of beds and their utilization.

**Opportunities of Tolna county in Hungary**

| Economy sector | Investment (million forints) | Rate (percent) |
|---|---|---|
| Agriculture | 4 715 | 10 |
| Energy | 8 230 | 18 |
| Construction | 15 800 | 34 |
| Total | 45885 | 100 |

Table 2. *Investments of economic enterprises in the first half of 2019.*
Source: KSH 2019

In Table 2 we can see the position of agriculture in Tolna county's total investment rate according to the KSH database. The data shows that only 10% of the total investments have gone into the agricultural sector in Tolna county. The largest rate is occurred in the construction sector with nearly one third of the total investments, because of its high capital-intensiveness.

The following table shows the paradox situation between different economic sectors in Tolna county.

| Economy sector | Number | Rate (%) |
|---|---|---|
| Agriculture and fishing | 2 614 | 5% |
| Energy | 2 808 | 6% |
| Construction | 3 876 | 8% |
| Commerce, maintenance | 4 681 | 9% |
| Total | 49 809 | 100% |

Table 3. Number of employed population in different economic sectors, Q1 of 2019
Source: KSH 2019

In Table 3 we can see the employed workforce in Tolna county in different economic sectors. The agricultural sector has employed more than two thousand people, closing on the energy sector, while required less total investments. These two statistics underlines the paradox situation of investment and employment in the rural regions like Zomba. Even though the agricultural investment rate is much lower than nearly every economic sector in Tolna, it employs large portion of the available workforce, closing on the biggest employer of Tolna county (MVM Paks).

In the following statistics we can look on the registered economical enterprises in Tolna county.

| Economy sector | Number of economical enterprises | Joint ventures | individual enterprises | Total number of enterprises | Non-profit enterprises |
|---|---|---|---|---|---|
| Agriculture and fishing | 13 398 | 459 | 12 924 | 13 383 | 15 |
| Energy | 63 | 31 | 30 | 61 | 2 |
| Construction | 2 456 | 821 | 1 634 | 2 455 | 1 |
| Commerce, maintenance | 3 336 | 1 539 | 1 794 | 3 333 | 2 |
| Total | **39 794** | **6 837** | **29 772** | **36 609** | **2 680** |

Table 4. Registered economical enterprises in different sectors and numbers. First half of 2019.
Source: KSH 2019

The statistics clearly shows the numbers of different registered enterprises in Tolna *county* in the first quarter of 2019. Nearly one-third of the total enterprises were found in the agricultural-fishing sector, with a high rate of individual entrepreneurs (nearly 96%). This rate shows that the agricultural sector is largely based on sole traders, which could be a disadvantage against the Hungarian government's industrial policies and decisions. The fragmented agricultural sector has lost its ability to represent their various and sometimes extremely local demands on higher political ground. In order to relieve the industrial pressure, the government took a step ahead with new agricultural programs through the Hungarian Chamber of Agriculture like scholarships, training courses, and agricultural forums.

**Conclusions**

Zomba and the rural regions of Hungary have many opportunities in agriculture. Although the Hungarian government have a clear vision of the "labour and work based society", it managed to establish only in different industrial branches and services areas like automobile industry and tourism. Many of the old traditional agricultural regions faced difficulties like decreasing rate of investments, shortage of available workforce and losing primary markets (both global and regional) as well.
The South-Transdanubian region has potential to survive on its own by strengthening regional ties (between counties: Baranya, Somogy and Tolna), relying on older traditions (agriculture) and acquiring the latest technologies. According to the Hungarian statistics the agriculture could become one of the leading sector for the rural regions, as it requires less investment and can rely on old traditions. The local agriculture can also provide more job opportunities to the unemployed members of the society.

**Keywords:** agriculture, strategic management, local development, industrial structure

## Literature

BREALEY, R., ALLEN, F., MYERS, S. (2017): Principles of Corporate Finance. New York: McGraw-Hill Education.

COLLIS, D. - MONTGOMERY, C. (1995): „Competing on Resources: Strategy in the 1990s." Harvard Business Review, 73(7), pp. 118-128.

DUCZON, Á. (2019a): Az oktatás szerepe a nemzeti gazdasági stratégia kivitelezésében. In: Karlovitz, János Tibor; Torgyik, Judit (szerk.) Szakmódszertani és más emberközpontú tanulmányok. Komárno, 2019. 471-477.

DUCZON Á. (2019b): Profitability of Agriculture in a Service-oriented World. Fehér-Polgár, Pál; Garai-Fodor, Mónika (szerk.) FIKUSZ 2018 - Symposium for Young Researchers Proceedings, Óbudai Egyetem Keleti Károly Gazdasági Kar (2018) pp. 87-102.

PISANO, G. – SHIH, W. (2012): Producing Prosperity: Why America Needs a Manufacturing Renaissance. Boston: Harvard Business Review Press.

HUNGARIAN CENTRAL STATISTICAL CENTRE (2018a). Egy lakosra jutó bruttó hazai termék (GDP/fő), 2016. Available at: http://www.ksh.hu/interaktiv/terkepek/mo/gdp.html. [Last Accessed: 2018. 09. 17.]

HUNGARIAN CENTRAL STATISTICAL CENTRE (2018b). A gabonafélék aránya a betakarított területből, 2016. [online] Available at: http://www.ksh.hu/interaktiv/terkepek/mo/mezogazd.html [Last Accessed: 2018. 09. 17.].

HUNGARIAN CENTRAL STATISTICAL CENTRE (2019): "Fókuszban a megyék" – 2019. I. negyedév. Available at: http://84.206.40.194/docs/hun/xftp/megy/191/index.html (last accessed: 2019. 10. 30)

# THE OPPORTUNITIES OF THE AGRARIAN MODELS IN THE SOUTH TRANSDANUBIAN REGION

*Árpád DUCZON[1]*

[1] University of Pécs Faculty of Business and Economics, Doctoral School of Business Administration 7622 Pécs Rákóczi út 80., arpad.duczon@gmail.com

## Introduction

The dominance of the service sector in the economy is typical today. In 2017, 63 percent of the world's total value produced came from services, 30 percent from industry and 7 percent came from agriculture. In the countries boasting the world's largest gross domestic products such as the United States, Germany, France, Japan or the United Kingdom, the weight of the service sector may range from 70 to 80 percent; accordingly, industry account for 10 - 30 percent, and agriculture between 0 and 2 percent. (Central Intelligence Agency, 2017) This global economic trend can be observed in Hungary, too, where the agricultural sector accounts for 4.4 percent of total gross domestic product, while 30.9 percent of it comes from industry and 64.7 percent from services. (Central Intelligence Agency, 2017)

The study consists of three sections.

In the first part I will examine the infrastructural status of Hungary, focusing on the Southern Transdanubian region. According to the latest data, the region has serious disadvantages like lacking proper motorway-lines, which has negative effect on the region's competitiveness. In the second part I will examine the economical background of South Transdanubia, with its three countys. After that I would like to show the population data and the local enterprises in Tolna county, which are factors in making opportunities in the rural country.

## Infrastructure in Hungary

The first pan-European transport development was decided on in the 1990s, with the aim of involving countries outside the Union - the East. After lengthy negotiations, the European transport ministers adopted the new, multimodal corridors in 1997, named after the city where the related decision was made in: Helsinki. Five of them pass through Hungary, such as Corridor IV. (Berlin - Budapest - Istanbul axis), Corridor V (Venice - Trieste - Budapest - Lvov), Corridor V / C. (Plocse - Sarajevo - Budapest); Corridor VII (Danube) and X / B. (Budapest - Belgrade) (Fleischer, 2002). Fleischer (2002) pointed out at an early stage that the Hungarian transport structure, which is in fact a single-centre on (Budapest), faces serious challenges, therefore we cannot accept the European efforts that make these challenges even more severe. In his opinion, Hungarian needs can be helped by North-South and East-West type developments, which could both alleviate the burden of Budapest and the resort towns around Lake Balaton, and respond to local needs (such as the Szolnok-Veszprém motorway).

Following the EU accession of the region (2004), the perception of these routes has changed since they are now part of a common EU strategy. That was the beginning of the rise of Trans-European Networks (TENs), which are based on national land-based infrastructures. Developing and coordinating them can increase cohesion and mobility within the European Union, which was one of the prime conditions of the organization (free movement) (Kisgyörgy, 2014).

| Indicator / dimension | Length of motorways per 100,000 inhabitants (km) | Length of expressways per 100,000 inhabitants (km) |
|---|---|---|
| Central Hungary | 4,9 | 14 |
| Central Transdanubia | 18,7 | 24,7 |
| Western Transdanubia | 12 | 33,4 |
| SouthernTransdanubia | 26,3 | 38,2 |
| Transdanubia | 18,8 | 31,7 |
| Northern Hungary | 12,3 | 15,3 |
| Northern part of the Great Plains | 11 | 13,5 |
| Northern part of the Great Plains | 14,2 | 17,2 |
| The Great Plains and the Northern areas | 12,4 | 15,2 |

Table 1. *The Key Data of the Hungarian road infrastructure in 2017*
Source: Figures in the table have been calculated by the author based on 2017 data by KSH.

It can be concluded from the data that Southern Transdanubia is the worst in terms of motorways (26.3 km of motorway for 100,000 inhabitants), followed by Central Transdanubia (18.7 km for 100,000 inhabitants). Northern Hungary, mentioned above regarding automotive industry, boasts better conditions in this respect, with having 12.3 km of motorways for a hundred thousand people in 2017. It can be stated that Transdanubia, especially its south-southwest corner, has a significant disadvantage in the development of motorways, which cannot be mitigated even by the industrial unit located in the western part of the area (Szentgotthárd, car factory).

Tolna country has 1216 kilometres of public roads, including the M6-s high-speed motorway, nine main roads, 49 main cross-roads, 38 access roads, and 10 junctions. The motorway runs through the eastern part of the country, which connects Tolna with the neighbouring countries of Baranya and Fejér and with the capital (Budapest) as well. Tolna is lacking well prepared and maintained roads that connect its Western and Eastern parts. Zomba has a connection with the M6 motorway through the main road. The other main road (Number 65) connects Zomba with Siófok and Szekszárd as well.

The railroad network is also lacking cross-country connections, as its center (Dombóvár) lies in the western part of the country.

The railroad 60 (Budapest- Dombóvár/Kaposvár – Gyékényes, and Pécs) reaches Tolna from the North and leaves it in the Southwest. Tolna's capital (Szekszárd) cannot be reached via train from there, only with a transfer. The second railroad runs through North to South, following the main road 63 (TOLNA 2013).
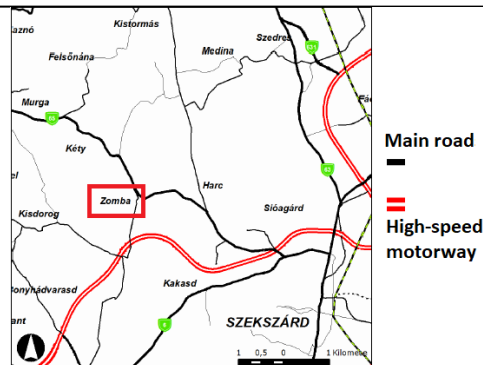
Figure 1. Position of Zomba in Tolna county
Source: Authors own edition based on Térport map (2019)

Tolna has a fairly large extended cropland (70,4%), including pomiculture, olericulture, and a historical wine-country. The processing industry needs to be strengthened because the absence of key infrastructures in 2011. In the development programme the local administration did a SWOT-analysis about Tolna country. It has showed the lack of networking among agricultural members (farmers), which can block the cooperation.

In 2011 Tolna county had 240 392 hectare agricultural fields and 310 160 hectare soil. The biggest portion were the plough-land areas (88,9%), where sugar beet, corn and sunflower were grown (TOLNA 2013),

In the Hungarian Central Statistical Office recent research (2018) we can find closer data of the South-Transdanubian (and Tolna county's) agricultural output. Even though the region is lagged behind in many sector, the report suggested that the South-Danubian region has achieved much more of the agricultural output in spite of its relative small territory. The report shows that the region is ahead in grains and cereals with medium production costs. In the research they also examined the region's livestock situation as well. Southern Transdanubia has high input on animal breeding per capita, especially in piggery (KSH 2018):

A Hungarian Bank (OTP) has made a booklet about the value of the Hungarian soils and measures. South Transdanubia – and especially Tolna county –has many arable lands, which are in the most expensive category (1.4 million forints / hectare). These territories are in the same bracket with the North-western part (Győr-Moson-Sopron county) and with the traditionally agricultural region of Eastern Hungary (OTP 2018).

**The economic background of Tolna county and the village of Zomba**

Table 3 shows that the added value of the service sector (47.6%) in Tolna County is lower than the national average (53.6%). While in all three counties of Southern Transdanubia the weight of agriculture is higher than the national average, in Tolna County, due to higher industrial performance, the distribution of added value is different.

|  | Baranya | Tolna | Somogy | National average |
|---|---|---|---|---|
| Agriculture | 9.3% | 10.4% | 11.1% | 7.3% |
| Industry | 24.5% | 42.0% | 23.5% | 39.1% |
| Services | 66.2% | 47.6% | 65.4% | 53.6% |

Table 2. Added value of the counties of the Southern Transdanubian region by sector.
Source: HUNGARIAN CENTRAL STATISTICAL CENTRE (2016): Gross Domestic Product Per Capita (GDP / Person), 2016.

As far as Tolna's agriculture is concerned, the cultivation of plants is decisive, while the weight of livestock production in the sector is negligible. 89% of the agricultural area is arable land, the highest in Hungary among the counties. The cultivation of grain within the county is dominant within the cultivation of plants: grain was grown on 72.9% of the harvested area in 2016 (Central Statistical Office, 2018c).

Zomba does not reflect the general dominance of industry in Tolna as seen in Table 3. Figure 3 shows that 65 per cent of the total turnover of the 54 enterprises registered in Zomba was accounted for companies pursuing their activities in agriculture. Similarly to Tolna county, the contribution of the service sector is lower, however, unlike in Tolna county, in Zomba, not the industry, but the predominance of agriculture explains the phenomenon.

At the beginning of this chapter, I made two statements which I wanted to confirm with relevant data. The first claim was that Zomba was basically an agricultural town. To assess this, I have mapped the structure of the economy of the whole country and Tolna County, and as a result I have shown that Zomba has a strong agricultural dominance as compared to both the county and country. The second claim was that tourism in Tolna County was relatively weak. The national data supported this claim well, both through the number of beds and their utilization.

|  | Baranya country | Somogy country | Tolna country | South Transdanubia | Hungary |
|---|---|---|---|---|---|
| Population (thousands) | 361 | 301 | 217 | 880 | 9 773 |
| Activity rate (%) | 62,1 | 54,6 | 58,9 | 58,7 | 62,9 |
| Employment rate (%) | 58,4 | 52,3 | 57,5 | 56,1 | 60,8 |
| Unemployment rate (%) | 6,0 | 4,2 | 2,4 | 4,5 | 3,3 |

Table 3.Population statistics of South Transdanubia, first half of 2019.
Source: HUNGARIAN CENTRAL STATISTICAL CENTRE 2019

In Table 3 we can see the statistical data of the population South Transdanubian region. According to the table we can see that Tolna is the smallest county with nearly 200 thousand inhabitants. The activity and employment rate is close to region's average, but falling behind from the national average. A slight difference is occurring in the unemployment rate, where Tolna is ahead of Baranya, Somogy and the national rate. This data has a connection with the fact that Tolna has the lowest population in the region, so the statistical data only shows a tendency to researcrhers.

In the next table we can analyse the registered local economical enterprises in numbers.

| Economy sector | Number of economical enterprises | Joint ventures | individual enterprises | Total number of enterprises | Non-profit enterprises |
|---|---|---|---|---|---|
| Agriculture and fishing | 13 398 | 459 | 12 924 | 13 383 | 15 |
| Energy | 63 | 31 | 30 | 61 | 2 |
| Construction | 2 456 | 821 | 1 634 | 2 455 | 1 |
| Commerce | 3 336 | 1 539 | 1 794 | 3 333 | 2 |
| Total | 39 794 | 6 837 | 29 772 | 36 609 | 2 680 |

Table 4. Registrated econimical enterprises in different sectors and numbers. First half of 2019.
Source: HUNGARIAN CENTRAL STATISTICAL CENTRE 2019

The statistics clearly shows the numbers of different registered enterprises in Tolna *county* in the first quarter of 2019. Nearly one-third of the total enterprises were found in the agricultural-fishing sector, with a high rate of individual entrepreneurs (nearly 96%). This rate shows that the agricultural sector is largely based on sole traders, which could be a disadvantage against the Hungarian government's industrial policies and decisions. The fragmented agricultural sector has lost its ability to represent their various and sometimes extremely local demands on higher political ground. In order to relieve the industrial pressure, the government took a step ahead with new agricultural programs through the Hungarian Chamber of Agriculture like scholarships, training courses, and agricultural forums.

### Conclusions

Summarizing my work I would like to address that the rural part of Hungary have opportunities to grow in an industrial business world. Zomba is a small village situated in the South-Transdanubian region with old agricultural traditions.
The county's infrastructure makes it difficult to take part in the "global" economical trends, as there is only one motorway and relatively narrow railroad capacity. According to the latest statistics Zomba has a huge advantage in the agricultural sector against its neighbouring areas with good quality of lands. Agriculture is employing many of the county's population, not to mention the registered econimical enterprises.
I think Zomba and the rural areaf of Hungary have a slight chance of survival in this global pursuit of economical welfare.

**Keywords:** agriculture, strategic management, local development, industrial structure

### Literature

CENTRAL INTELLIGENCE AGENCY (2017): The World Factbook: GDP – Composition, By Sector of Origin. Available at: https://www.cia.gov/library/publications/the-world-factbook/fields/2012.html [Last Accessed: 2018. 09. 17.]
HUNGARIAN CENTRAL STATISTICAL CENTRE (2016): Gross Domestic Product Per Capita (GDP / Person), 2016.
HUNGARIAN CENTRAL STATISTICAL CENTRE (2019). "Fókuszban a megyék" – 2019. I. negyedév. Available at: http://84.206.40.194/docs/hun/xftp/megy/191/index.html (last accessed: 2019. 10. 30)

DUCZON Á (2019): Duczon Á. (2019): Az oktatás szerepe a nemzeti gazdasági stratégia kivitelezésében. In: Karlovitz, János Tibor; Torgyik, Judit (szerk.) Szakmódszertani és más emberközpontú tanulmányok. Komárno. 471-477.

DUCZON Á.

FLEISCHER (2002): Fleischer, T (2002): Néhány gondolat a Magyarországot átszelő közúti közlekedési folyosókról. Magyar Tudomány, 47. (2002), 10. szám. 1354-1367

KISGYÖRGY (2014): Kisgyörgy L. (2014): Utak. Budapest (https://www.tankonyvtar.hu/hu/tartalom/tamop412A/2011-0023_Utak/adatok.html) Last access: 2019.10.30.

KSH (2017): KSH 1.4.1. Közlekedési infrastruktúra (2003–2018). https://www.ksh.hu/thm/1/indi1_4_1.html (Last accessed: 2019. 10.30)

KSH (2018): A mezőgazdaság szerepe a nemzetgazdaságban, 2018.

OTP (2018): OTP Termőföld Értéktérkép, 2017,

PISANO – SHIH (2012): Pisano, G. – Shih, W. (2012): Producing Prospoerity: Why America Needs a Manufacturing Renaissance. Boston: Harvard Business Review Press.

TOLNA (2013): Tolna megye gazdaságfejleesztési terve, 2014-2020. Szekszárd.

# ECONOMIC EFFECTS OF THE ELECTRONIC SMALL-SCALE PRODUCER LICENSE AND THE ELECTRONIC PUBLIC ROAD TRADE CONTROL SYSTEM FROM THE POINT OF VIEW OF TAXATION

*Andrea RÁKÓCZI – Attila RÁKÓCZI*

Szent István Egyetem, Agrár- és Gazdaságtudományi Kar, Tessedik Campus
5540 – Szarvas, Szabadság u. 1-3.; rakoczi_andi@freemail.hu

## Introduction

Due to the exponential growth of the population of Earth, the population reached 7 billion by the beginning of the 21st century (ROBERT E. LUCAS 2000). With regard to our planet, it means enhanced load as the area of arable land decreases and at the same time the area occupied by cities and roads increases. The risks arising from the environment pollution also affect the living spaces and the agricultural productivity. It entails that the food for the ever growing population must be supplied from ever decreasing agricultural areas.

Since the establishment of Hungary, agriculture has always played a significant role in our country. During the different historical eras agriculture has always had a key role in the economy, in some eras even more so than in others. After Hungary joined the European Union, and especially in recent years, agriculture has shown growth in the GDP. The share of agriculture in the GDP is 3.6%, which is double the EU average. Owing to the conditions of Hungary and the continuously growing demand for food, agriculture plays a significant role in the economy (KSH 2018). There must be great opportunities in our country for the agriculture, despite the fact that the GDP digits are low. Agriculture is a strategically important sector.

It is true for the agriculture, as well as for the other economic sectors, that the old administration systems for the production, sales, taxation and administration have become obsolete due to the digitalized administration. Therefore the government continuously develops new systems, and these are the main topics of my scientific work.

The objective of my work is to highlight the possible weaknesses of the old small-scale producer administration system through the activities and taxation of a sample farm, and to draw attention to the significance of the introduction of the Electronic Public Road Trade Control System (EKÁER), and also to show the economic importance of the parallel operation of the abovementioned two systems.

## Literature review

In Hungary, the small-scale producers have special taxation rules, which is unique even in Europe. Private persons may acquire a joint small-scale producer license, which means that people living in the same household wish to pursue the small-scale producer activities together with their family members. The precondition for the joint license is to have the same permanent or temporary address. A family member may be the small-scale producer's spouse, direct ascendant or descendant, adopted or step children, or the

step parent or guardian of the adopted person. Another condition is to choose the same taxation method for all the members in the joint license.

On 1ˢᵗ July 2016 the definition of agricultural small-scale producer was modified. The main point of the change was that the small-scale producer license may only be obtained if the private person has own farm on the territory of Hungary, or if the assets of the small-scale producer includes rented land (NAV 2016).

Act LII of 2018 on the new social contribution came into force on 1ˢᵗ January 2019. According to the said regulation, the tax rate of the agricultural small-scale producers shall be 17.5% annually, instead of 27% as of 1 July 2019 (NAV 2019).

436/2015 (XII.28) Governmental decree on the new agricultural small-scale producer license came into force 1ˢᵗ January 2016 (Hungarian Journal 2016).

The administration of the small-scale producer license, the issue, modification, change or withdrawal of the license may be requested at the county administration organisation competent for the permanent address of the client. The direct contact persons are the village consultants.

The aim of the new regulation is to enable the customers to recognize the small-scale producers who have valid license, to identify the small-scale producers' products produced in Hungary. For this end, the small-scale producers, at the place of sale or on the product, have to give their license number and the words "Product from own small-scale producer activity" to inform the customers suitably.

A part of the goods trade is goods imported to Hungary, and a significant part of those goods is agricultural products, raw materials, foods. After many decades a system was long due which ensures food safety and proper state tax income. The modern information technology, satellite technology and the internet access made the system possible. The system of e-road toll was introduced in 2013. The amount of the toll depends on the number of axles, environmental classification, weight of the vehicle and the type of the road and other environmental conditions.

The taxation law of 2014 contained modifications for the whitening of the economy. The introduction of EKÁER played an important role in the regulation. (CSETE 2006). The aim of the system is to avoid the circulation of goods which were not previously reported to the tax authority (EKÁER 2016).

The main topic of my research is the trade of water melon. Water melon is one of the most popular seasonal vegetables, and its nutrition content reaches the values of fruits. However, it is important to note that the trade of water melon (by small-scale producers, traders) is often in the center of attention, therefore is a good example for my research. In Hungary, almost every village and town produces something on smaller or bigger areas. The main agricultural areas are Heves, Békés and Baranya county. (BALÁZS 2004).

**Material and method**

Through the operation of the sample farm I draw the attention to the weaknesses of the previous administration systems (agricultural administration, taxation and EKÁER for small-scale producers). I put special emphasis on taxation, mainly on tax payment and tax avoidance, thus proving the economy whitening effects of the newly introduced systems (electronic small-scale producer license, EKÁER).

From the point of view of the small-scale producers, I examine the possibilities of "loopholes" of the administration and taxation regulations in force before the introduction of the new regulations through the activities of the sample farm, with five approaches. I highlight the possible weaknesses of the old regulation with the results of the tax return made on the basis of the five scenarios.

*Features of the tax returns made on the basis of the five scenarios:*
"A": the sample joint small-scale producer produced 30 tons of water melons per hectare, altogether 120 tons of water melons, and sold the whole quantity directly to the customers at the market. The average price per kilo was 79 HUF.
"B": the small-scale producer sold the produced 120 tons of water melons, and bought another 80 tons illegally, from other producers who do not have licenses or certificates, or bought illegally imported early water melons. Thus the producer sold 200 tons of water melons and reported this quantity as own production. In reality, the own production was 120 tons and 80 tons were illegally obtained. The average price of the 80 tons was 30 HUF, and sold at 79 HUF. The 79 HUF price was given in the tax return.
"C": in this case the small-scale producer sold the 120 tons of own production at 79 HUF average price as own production and indicated it in the tax return. The average price of the illegally obtained 80 tons was 30 HUF/kg, and sold at 79 HUF. However, the illegally obtained 80 tons were not indicated in the tax return.
"D": in this scenario we take the data from scenario "B", but in this case the small-scale producer followed the regulations and the 80 tons of water melons were not given as own production, but as sold in trade. Thus 120 tons were sold as small-scale producer activity, and 80 tons were sold as individual entrepreneur activity, and the tax was paid accordingly. The average price of the water melons sold in both activities was 79 HUF/kg, the 80 tons were bought at 30 HUF/kg.
"E": in this scenario we wish to demonstrate what happens when the small-scale producer produces more water melons with higher investment. The expenditure per hectare is higher, but he/she produces altogether 200 tons of water melons (50t/ha), as in the above scenarios, and gives this quantity in the tax return as own production. The tax is paid as it is specified for small-scale producers. The average price is 79 HUF/kg. The costs of the production technology and the related costs are higher, and also the transport costs are higher due to the higher quantity.

## Results and evaluation

For easier comparison the results are shown in a summarizing table.

| model | „A" | „B" | „C" | „D" | „E" |
|---|---|---|---|---|---|
| Earnings before tax | 3.211.452 | 7.003.452 (2.400.000 cost not accountable) | 3.211.452 | 7.131.452 | 4.996.147 |
| Amount of tax | 1.180.924 | 2.811.484 | 1.180.924 | 2.631.324 | 1.948.344 |
| Net income | 2.030.528 | 1.791.968 | 5.950.528 (3.920.000 /from illegal trade/ 2.030.528) | 4.500.128 | 3.047.303 |

*Table 1. Income statement based on the tax rules of 2015*
earnings before tax (1); amount of tax (2); net income (3)

| model | „A" | „B" | „C" | „D" | „E" |
|---|---|---|---|---|---|
| Earnings before tax | 3.211.452 | 7.003.452 (2.400.000 cost not accountable) | 3.211.452 | 7.131.452 | 4.996.147 |
| Amount of tax | 842.322 | 2.076.122 | 842.322 | 2.354.462 | 1.423.748 |
| Net income | 2.369.130 | 2.527.330 | 6.289.130 (/3.920.000 from illegal trade / 2.369.130) | 4.776.990 | 3.572.400 |

*Table 2. Income statement based on the tax rules of 2019*
earnings before tax (1); amount of tax (2); net income (3)

According to the taxation rules of 2019, the rate of the personal income tax decreased from 16% to 15%. Furthermore, the health contribution (EHO) of 27% for the small scale producers was replaced by the social contribution (SZOCHO), the rate of which is 17.5%. This modification significantly changed the amount of tax, therefore the net income increased.

Evaluation of scenario "A": The rate of the personal income tax decreased to 15% compared to 2015, and the rate of the social contribution (previously EHO) decreased to 17.5%, however, it still does not have an upper limit. As it can be seen in Table 8, the earnings before tax remain the same, but the tax payable decreased to 842 322 HUF, the net income increased due to the tax reduction with more than 300 000 HUF, so altogether in 2019 it was 2 369 130 HUF.

Evaluation of scenario "B": The earnings before tax remain the same, and the not accountable cost of 2 400 000 HUF is still there. The tax payable decreased with 800 000 HUF due to the modified personal income tax and the social contribution, so the payment obligation is 2 076 122 HUF, thus the net income is higher, 2 527 330 HUF.

Evaluation of scenario "C": The earnings before tax remain the same for 2019, the tax payable decreased with more than 300 000 HUF due to the tax reduction, to 842 322

HUF. The net income is 6 289 130 HUF, but the income of 3 920 000 HUF from the illegal trade is not given in the tax return.

This behaviour entails high risks due to the inspections.

Evaluation of scenario "D": As the data in Table 2 show, the earnings before tax remain the same, the amount of tax payable decreased to 2 354 462 HUF. Therefore the net income increased with more than 250 000 HUF to 4 776 990 HUF. The social contribution of the individual entrepreneurs increased from 14% to 17.5%, which is the same as in case of the small-scale producers, but for the small-scale producers there is still not an upper limit. The upper limit for the individual entrepreneurs is 450 000 HUF. In case of the personal income tax, the rate is 15% for both cases.

Evaluation of scenario "E": the extra production for the higher income provided increased income with 500 000 HUF due to the changes of the taxation rules in 2019 compared to the previous years. Thus the income was 3 572 400 HUF. It can be stated – on the basis of the data of scenario "E" – that it is more profitable to sell the extra 80 tons as an individual entrepreneur, because in this case the income is higher than in the case when the small-scale producer produces extra quantity with extra expenditures.

**Conclusions**

My scientific work reached its set goals. It showed that the introduction of the electronic small-scale producer license and the operation of the EKÁER system have significant whitening effects in the economy.

The higher income shown in scenarios "B" and "C" may be attractive, but these activities are against the law and entail high risks according to the above explanation (EKÁER). Therefore to pursue those activities is not realistic.

The modification of the taxation rules of 2019 does not cover the small-scale producers, thus the traders are still in a better position when it comes to taxation.

The taxation system in force from 2019 provides more favourable financial conditions for the small-scale producers compared to the previous years, thus it encourages the producers to produce more for higher income.

I recommend the maximum amount limit of the social contribution for the small-scale producers as well, for more favourable profitability and the resulting esteem.

**Summary**

In my scientific work I examined the operation of the electronic small-scale producer licence and the Electronic Public Road Trade Control System (EKÁER) in connection with a sample farm. The operation of the sample plant was studied on the basis of 5 scenarios.

To sum it up, I concluded that it is not worth it for the licensed small-scale producers to produce more in the hope of higher income, however, after the change in the taxation rules, this year the small-scale producers are in a better position compared to 2015.

Thus the current taxation rules are more favourable for the licensed small-scale producers, but I recommend the introduction of a maximum amount limit for the small-scale producers, just as in the case of the trading entrepreneurs.

**Key words:** Electronic Public Road Trade Control System, EKÁER, Electronic small-scale producer license

## Literature

BALÁZS S. (2004) (Szerk.). Zöldségtermesztők kézikönyve. Mezőgazdasági Kiadó, Budapest, pp. 633.

CSETE I. (2016): Dinnyéseket érintő szabályváltozások. Békés Megyei Hírlap LXXI 199. 2. p.

EKÁER(2016): https://ekaer.nav.gov.hu/articles/view/az-elektronikus-kozuti-aruforgalom-ellenorzo-rendszer-bevezetesevel-kapcsolatos-uj-kotelezettsegekrol

KSH (2016): http://www.ksh.hu/mezogazdasag

NAV(2016): NAV 6-os számú információs füzet - Mezőgazdasági őstermelő magánszemély adózásának alapvető szabályai

NAV(2019): NAV 6-os számú információs füzet – Mezőgazdasági őstermelő magánszemély adózásának alapvető szabályai

RE Lucas - Journal of Economic Perspectives, 2000

# COMPARSION OF HUNGARIAN LABOR MARKET DATABASES

*Tímea GYŐRI [1] – Krisztián JÁRDÁNY [2]*

[1] SZIE-GTK Enyedi György Regionális Tudományok Doktori Iskola, e-mail: gyoritimi05@gmail.com
[2] SZIE-GTK Enyedi György Regionális Tudományok Doktori Iskola, e-mail: krisztian@borvar.hu

## Introduction

Labor market analyzes and forecasts are of crucial importance in many Hungarian and EU policies. Labor market statistics (activity, employment and unemployment rates) can be used, inter alia, to prepare employment policy decisions and to define regional labor force development tasks. Employment policy is partly a system of conscious state interventions and policies aimed at the entry and retention of disadvantaged groups into the labor market (Kövér, 2012).

When reviewing and processing the labor market situation in Hungary, we can basically rely on two types of databases: firstly, the Központi Statisztikai Hivatal (KSH) labor force surveys, and secondly, the database of the customer management system used by the Nemzeti Foglalkoztatási Szolgálat (NFSZ). The two databases characterize the labor market with different data, which can be explained by the differences in the content and methodology of the two methodologies (Tóthné Sikora, 2002).

The development of EU employment strategies requires consistent and internationally comparable information on the main developments in the labor market. The medium-term objectives of the Hungarian employment policy have been defined in line with the European Union's Europe 2020 strategy for jobs and growth. The strategy's objectives include raising the employment rate for people aged 20-64 to 75% by 2020. The European Commission recommends that the guidelines be followed at regional, national and EU level. The 2008 economic crisis highlighted Europe's structural weaknesses, which were already apparent before the crisis. The EU has also lagged behind in terms of economic growth and employment rates in other parts of the world. In the light of the above, the main challenge for the Europe 2020 strategy is whether it can prevent an instinctive return to pre-crisis situations.

The crisis has also highlighted the interdependence of our national economies (reforms in one country also affect the performance of others), and our reflection on the crisis shows that together we are much more effective. It follows from the above that social and territorial cohesion is the basis for achieving the objectives set at Member State and regional level. [1] The labor market situation is also an important component of harmonious territorial development (Egri-Tánczos 2016, Egri-Kőszegi 2018).

## Literature review

The Központi Statisztikai Hivatal has been conducting labor force surveys (LFS) since 1992 in accordance with the methodology of the International Labor Organization (ILO) (Kaiser - Kis, 2014). In the formulation of the KSH, the LFS is a representative sample

---

[1] European Commission (2010): Europe 2020. Source: https://ec.europa.eu/eu2020/pdf/1_HU_ACT_part1_v1.pdf (2019-09-26)

of private households providing internationally comparable information on the economic activity of persons aged 15–74 and on the main processes in the labor market at national or regional level (Borbély-Pecze - Ignits, 2018). The LFS sample averages around 38,000 addresses per quarter. A feature of data collection is that the KSH does not publish monthly data, but the three-month averages, which are subject to sampling error, the smaller the range of data is analyzed, the greater the sampling error rate (Fazekas - Varga, 2015). Data up to 2500-4999 people can only be maintained with reservation due to high sampling error and over 2500 people are ignored. [2]

The KSH defines the employed and the unemployed according to the standards set out in the ILO recommendations as follows: [3]

One is considered to be an employed person who, during the reference week, worked at least one hour a week in a gainful employment or had a job where he was temporarily absent. There are several reasons for using the one-hour criterion: on the one hand, this ensures that all types of employment in the country can be taken into account; He is considered an unemployed person who has been out of work most of the year and has no job for which he was temporarily absent during the four weeks prior to the interview. The first comprehensive unemployment data worldwide is derived from administrative records (Nagy, 2011). The NFSZ has been continuously registering the unemployed since 1989, with unemployment being the most basic area of the Office's data collection activities (Fejes, et al., 2006). The primary sources of administrative files are the Employment Offices of the District Offices, and personal data collected during the administration serve as a basis for municipal, district, county, regional and national data sets (Dávid et al., 2011). The definition of NFSZ is contained in Act IV of 1991. (5) (d) of the Act, which provides that a person who: 'has the conditions necessary to establish an employment relationship ... shall cooperate with the State Employment Service in finding employment and shall be registered as a person seeking employment'.

Thus, the first and most important reason for the difference in the content of the two types of databases is the different concept system, and the other reason is the different interpretation of job search activity (Kövér, 2012). One of the benefits of registration is that it is a lot cheaper to produce statistics that are up to date on a monthly basis according to the 20th of the current month. Registration involves the entire range of stakeholders, so it is more reliable than the questionnaire survey used by the KSH, in which in many cases distortions are due to the ignorance and inaccurate answers of the respondents (Tóthné Sikora, 2002). Many of the registered jobseekers - often due to insufficient local labor market demand - do not actively seek employment and are therefore excluded from the unemployed in the KSH survey (Fehér, 2009). However, the NFSZ survey method ignores householders, forced entrepreneurs and the unemployed who for some reason have not registered themselves. (Nagy, 2011).

The number of those who are registered also depend on the benefits of registration, so it may be that more people are registering for the sake of higher benefits (Bódis et al., 2005).

---

[2] Source: http://statinfo.ksh.hu/Statinfo/haDetails.jsp?query=kshquery&lang=hu (2019-09-18)
[3] Source: https://www.ksh.hu/docs/hun/agrar/html/fogalomtar.html (2019-09-18)

Neither the Labor Force Survey nor the registered unemployment indicators give a completely reliable picture of unemployment and its territorial structure (Tóthné Sikora, 2002).

**Material and methods**

In our research we collected data from secondary sources, and in our research we used the public databases of the KSH and the NFSZ. In the study, we primarily aim to introduce the two basic labor market databases (KSH, NFSZ) available in Hungary and their most significant differences. By exploring the differences, we sought to find out which database is better suited for assessing the labor market situation in Hungary. As part of the research, we have prepared a unified table illustrating the differences between the two databases for the period 2015-2019. In the case of the relative rate published by the NFSZ, the numerator in the national, regional, county and district level databases is the economically active age group of 15-74, with the exception of settlement series data, where the rates are calculated as a proportion of the working age population of 15-64. In the analysis, the numerator of calculated rates is in each case given by the number of economically active persons in the given age group, as reported by the KSH. The comparative table provides data on unemployment and employment in three age groups (15-74, 15-64, 20-64), illustrating how they change across the age groups.

In the remainder of the research, we have touched on some of the most recently available data currently available, using selected territorial disparity indicators. Special attention was paid to the study of the regional and regional disparities of the 20-64 age group. The priority age group is gaining ground in international comparisons for calculating labor market indicators, as a large proportion of the EU population continues their studies in higher education. The research will look at whether the Europe 2020 employment target is being met at national or regional level.

The concentration of the unemployed between the ages of 20 and 64 by age groups was plotted on both Lorenz curves to illustrate their differences. The Lorenz curve is a special, one-sided, graphical graph (Kehl - Sipos, 2011), which is suitable for visualizing and comparing inequalities. In the case of complete equality, the curve coincides with the diagonal of the square (Kleiber, 2007). The NFSZ keeps jobseekers broken down into 6 age groups, and the data by age group published by the KSH have been recalculated and represented accordingly.

The correlation between unemployment and job vacancy rates for a particular age group is illustrated in the Beveridge curve. The vacancy rate is the ratio of the number of vacancies to the number of employees (Lipták, 2014). Data from the period 2009-2019 were plotted on the curve to analyze the relationships between the rates. The author Dow and Dicks-Mireaux, who made the curve, found a negative relationship between the two rates, and when the economy is in recession, high unemployment is associated with few vacancies (Rodenburg, 2007).

In the study, the dual index and the Hoover index were used to further examine territorial disparities. The Hoover index is a distribution type indicator commonly used in Hungarian research (Kiss - Németh, 2006). The basic data of the investigations were provided by the NFSZ database, because the registration involves a larger number of stakeholders, and they can be accessed at district level, even at settlement level. The

KSH data are mainly national, rarely regional, and thus do not allow the analysis of smaller areas. For the 15-64 age group reported by the NFSZ, the most recent data on the number of registered unemployed by settlement series refer to July 2019, which is aggregated by districts according to 86/2019. (IV. 23.) Government regulation. As part of the research, the relative unemployment rate was analyzed using the dual indicator at several territorial levels, and the difference in the regional distribution of vacancies and jobseekers were examined by calculating the Hoover index.

**Results**

The following table summarizes the data of the unemployment rate as interpreted by the KSH and the relative unemployment rate as interpreted by the NFSZ by age groups highlighted in the context of labor market surveys: [4]
15-74 aged: ILO Recommendation on labor market monitoring. (KSH-LFS scope of observation.)
15-64 aged: European Union recommendation on labor market monitoring.
20-64 aged: Observing empoyment targets in the Europe 2020.

Reviewing the above data, it can be concluded that on one hand, the two databases have very different relative unemployment rates, as reported by the NFSZ, and on the other hand, the values of the two indicators follow the same trend. In recent years, despite the steady decline in the population, the number of economically active people has increased, while the number of the unemployed has also fallen, so the labor reserve (number of inactive) is following a declining trend. According to the KSH, the number of unemployed persons in the 20-64 age group was 150,712 persons on the national average in the first half of 2019, and the calculated unemployment rate was 3.3% compared to the economically active population. According to NFSZ, the same figures are 252,929 persons and 5.6%, which means a much worse picture. By narrowing the age groups, the number of active people increases and the activity rate is higher. According to the latest data, the activity rate for the 15-74 age group is 62.88%, while for the 20-64 age group it is 77.69%, and the same is true for unemployment and employment rates.

According to the data of the KSH, the target set in the Europe 2020 strategy of raising the employment rate to 75% of the population aged 20-64 was successfully achieved in 2019. The employment rate in 2018 was 74.4% on the national average. The achievement of the target value was examined at the regional and county level for the 2018 available date. The results confirmed the country-specific regional differences. In contrast to the higher employment rates in the northwestern and central territories, the eastern and southern regions were below average. At regional level, three regions met the requirements in 2018: Nyugat-Dunántúl (78.2%), Közép-Magyarország (77.5%) and Közép-Dunántúl (76.2%). Dél-Dunántúli (68.6%) was the worst, but Észak-Magyarország (70.4%), which was heavily affected by the decline of the heavy industry, and the economically less developed Észak-Alföld (71.4%) and the national average.

---

[4] KSH – Módszertan – Foglalkoztatottság és munkanélküliség. Forrás: http://www.ksh.hu/docs/hun/modsz gyors/fogmodsz1907.html (2019-09-16)

| Period | 15–74 aged | | | | | | |
|---|---|---|---|---|---|---|---|
| | KSH | | | | | NFSZ | |
| | Population aged 15–74 (capita) | Economic-ally active (capita) | Unemploy ed (capita) | Unemplo yment rate (%)* | Employm ent rate (%)* | Register ed unemplo yed (capita) | Relativ e rate (%)* |
| 2015. | 7.537.937 | 4.518.343 | 307.846 | 6,8 | 55,9 | 378.181 | 8,4 |
| 2016. | 7.507.525 | 4.586.217 | 234.579 | 5,1 | 58,0 | 313.782 | 6,8 |
| 2017. | 7.460.353 | 4.613.090 | 191.708 | 4,2 | 59,3 | 282.970 | 6,1 |
| 2018. | 7.432.170 | 4.641.600 | 172.132 | 3,7 | 60,1 | 255.310 | 5,5 |
| 2019/I. | 7.420.038 | 4.662.774 | 165.722 | 3,6 | 60,6 | 266.175 | 5,7 |
| 2019/II. | 7.421.324 | 4.666.348 | 155.488 | 3,3 | 60,8 | 254.338 | 5,5 |
| Period | 15–64 aged | | | | | | |
| | KSH | | | | | NFSZ | |
| | Population aged 15–64 (capita) | Economic-ally active (capita) | Unemploy ed (capita) | Unemplo yment rate (%)* | Employm ent rate (%)* | Register ed unemplo yed (capita) | Relativ e rate (%)* |
| 2015. | 6.530.403 | 4.482.741 | 306.969 | 6,9 | 63,9 | 378.181 | 8,4 |
| 2016. | 6.477.890 | 4.543.222 | 233.861 | 5,2 | 66,5 | 313.782 | 6,9 |
| 2017. | 6.415.180 | 4.564.893 | 191.495 | 4,2 | 68,2 | 282.970 | 6,2 |
| 2018. | 6.369.467 | 4.582.412 | 171.760 | 3,7 | 69,2 | 255.310 | 5,6 |
| 2019/I. | 6.340.439 | 4.594.953 | 164.913 | 3,6 | 69,9 | 266.175 | 5,8 |
| 2019/II. | 6.334.037 | 4.588.636 | 154.818 | 3,4 | 70,0 | 254.338 | 5,5 |
| Period | 20–64 aged | | | | | | |
| | KSH | | | | | NFSZ | |
| 2015. | 6.031.699 | 4.449.965 | 296.274 | 6,7 | 68,9 | 365.700 | 8,2 |
| 2016. | 5.990.331 | 4.509.619 | 225.028 | 5,0 | 71,5 | 302.542 | 6,7 |
| 2017. | 5.934.236 | 4.530.843 | 183.324 | 4,0 | 73,3 | 272.621 | 6,0 |
| 2018. | 5.891.752 | 4.546.472 | 163.609 | 3,6 | 74,4 | 246.075 | 5,4 |
| 2019/I. | 5.863.900 | 4.555.470 | 154.518 | 3,4 | 75,1 | 257.166 | 5,7 |
| 2019/II. | 5.857.074 | 4.550.317 | 146.906 | 3,2 | 75,2 | 245.792 | 5,4 |

Table 1. *Labor market indikators by priority age groups 2015-2019*
*Relative to the economically active population.
(1) Own editing and calculation based on data from the KSH and the NFSZ

At county level, the employment rate is highest in Győr-Moson-Sopron county (79.8%), followed by Budapest and Vas counties (78.4%), the lowest rate in Somogy (64.6%), Borsod-Abaúj-Zemplén ( 69.1%) and Tolna (69.5%) counties. Based on the above, it can be stated that in 2018 Hungary approached the target value at the national level, but in many cases it remained well below the target value.

The concentration of the number of unemployed persons aged 20-64 determined by the two different databases by age groups is plotted on the Lorenz curve. Potential concentrations and their magnitudes are illustrated by the ratio of cumulative relative frequencies to values. The two figures below illustrate the concentration of unemployed persons collected in different age-appropriate databases.
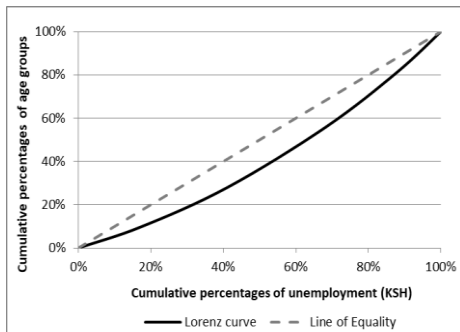
Figure 1. Lorenz curve (KSH)
(1) Own editing based on KSH data
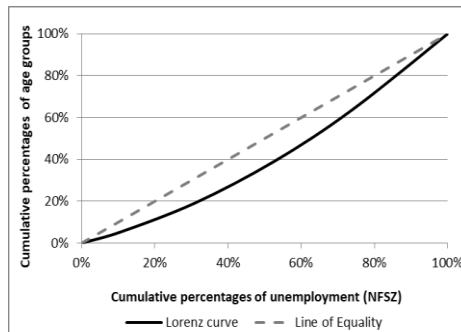
Figure 2. Lorenz curve (NFSZ)
(1) Own editing based on NFSZ data

The concentration of unemployment can be visualized by voluntarily extracting data, for example, 11.24% of all registered unemployed are under 24 but only 5.7% are unemployed. In the case of the KSH, we get different data, here 17.32% of the unemployed are under 24 years, but only 9.81%.

The two curves enclose almost the same area with the equation diagonal, so the curves represent the same concentration, the greater the relative concentration, the greater the distance of the curves from the diagonal. In the present cases, there is no significant concentration.

The Beveridge curve illustrates the relationship between the vacancy rate of vacancies (the ratio of job vacancies to the economically active population) and the relative unemployment rate in the first half of 2009 to 2019.
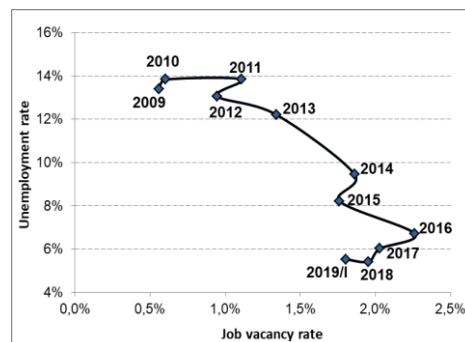


Figure 3. Beveridge curve
(1) Own editing based KSH and NFSZ data

The figure clearly shows that during the period of growth between 2010 and 2016, the under-utilization rate increased with the decrease of the unemployment rate, so the two factors moved in the opposite direction.

Reflecting the employment prospects on the Beveridge curve, reflecting the employment prospects that have become more uncertain as a result of the crisis and the financial burden on housing (foreign currency loans), increased labor-intensive migration, especially to EU Member States. This picture is further subdued by

demographic trends, and natural growth is far below the natural decline of regional and local populations, while the local human resources reserve is characterized by an aging age structure. Foreign employment, emigration, an aging population all reduced domestic indicators.

After 2016, while unemployment continued to decline, the under-utilization rate also showed a downward trend. Shifting the full curve inward, reducing vacancy rates, while lowering the unemployment rate, may even indicate an improvement in job matching: easier filling of vacancies than before, better skills (skills, experience) and workforce skills required by employers They fit. In our opinion, however, the degree of fit is not optimal, only in the current labor market situation have companies been forced to lower their expectations of employees.

The latest data on the number of registered unemployed reported by the NFSZ refer to July 2019. Spatial disparities in the relative unemployment rate of the working-age population aged 15-64 were analyzed using a dual indicator. The results show that the higher the levels examined, the greater the level of correlation. The differences are also reduced by ignoring Budapest in the calculations. In districts with higher relative unemployment rates, the index is 3.0735 times higher than in districts with lower rates.

| Territorial levels | Dual-index | |
|---|---|---|
| | Total | without Budapest |
| Regional level | 2,1366 | 2,0557 |
| County level | 2,4340 | 2,3204 |
| District level | 3,0735 | 2,6859 |

Table 2. *Dual-index at different territorial levels*
(1) Own calculation based on NFSZ data for July 2019

The relationship between the number of vacancies registered and the number of jobseekers was also examined for the month of 07.09.2019 using the Hoover index at the county and regional level. As a result of the survey it can be stated that 24.5% of vacancies at county level and 21.3% at regional level should be redeployed so that their territorial distribution is equal to the number of jobseekers. Ignoring the data of the capital, the indicator is 17.8% at county level and 14.6% at regional level, thus showing a higher level of equalization.

**Conclusions**

In the course of the study it was found that in addition to the fact that the databases of the KSH and the NFSZ are fundamentally different, there are differences within the databases as well. According to the appendix published on the website, the denominator of the relative unemployment indicator in the national and county level time series of the NFSZ data is the economically active population defined by the KSH, while in the case of settlement series data the population is 15-64 years old. In the majority of our research we encountered the problem that there is no consensus between the two databases, the data are not comparable with each other, therefore the rates are often based on our own calculations. In our opinion, it would be reasonable to harmonize the publicly accessible NFSZ and KSH databases. Our research highlighted the need for vertical alignment and horizontal widening of freely available data for relative rates published by the NFSZ. By this, we mean that relative rates should be available at

national, regional, county, district, and municipal levels for a particular age group, and that a given territorial level should also be available in several priority age groups.

The age group of 20-64 years is of international importance for the age groups, therefore it would be worth expanding the publicity of the data collected by the NFSZ so that not only the expert databases can be found at the regional level but also their holistic publicity.

In our view, there is a need to create a single, publicly accessible database, expanded in the light of the above, that makes up-to-date information provided by the NFSZ transparent and available.

Examining regional disparities, regional disparities persist in the labor market, although they have been declining since 2010. Shifting on the East-West divide axis, which used to be characteristic of Hungary, can be observed. Nyugat-Dunántúl, Közép-Magyarország and Közép-Dunántúl continue to have high employment rates. The employment rate of our formerly worst-hit regions, heavily affected by the decline of heavy industry, Észak-Magyarország and the economically less developed Észak-Alföld, improved after their previous position after 2016, making Dél-Dunántúl ranking in the last region.

## Summary

In the study, we aimed primarily to introduce the two basic labor market databases available in Hungary and their most significant differences.

By exploring the differences, we sought to find out which database is better suited for assessing the labor market situation in Hungary. After analyzing the databases, we have come to the conclusion that our research on regional disparities is based on the NFSZ database, because registration involves a larger number of stakeholders, and these data are available at district level, even at settlement level. Our research highlighted the need for vertical alignment and horizontal widening of freely available data for relative rates published by the NFSZ. In our view, there is a need to create a single, expanded, publicly accessible database that will make up-to-date information provided by the NFSZ transparent and available.

In our paper we examined whether the achievement of the Europe 2020 employment target is achieved at national or regional level. It was found that in 2018 we were close to meeting the 75% employment target at national level (we achieved it in 2019), but at the regional level several regions remained below the target, although the regional disparities had been showing decreasing since 2010.

Several inequality indicators were we used to illustrate inequalities in different categories of analysis.

The concentration of unemployed persons aged 20-64 by age group was plotted on the Lorenz curve, while the relationship between unemployment and job vacancy rates were illustrated on the Beveridge curve, and the dual index and the Hoover index were used for our analyses. Examining spatial disparities, we concluded that regional disparities are different but still significant.

**Keywords:** labor market, unemployment, employment, regional differences

## Literature

Borbély-Pecze T. – Ignits Gy. (2018): A magyar foglalkoztatási szolgálat története narratívákban 1991-2016. Nemzetgazdasági Minisztérium Foglalkoztatási Szolgálat Főosztály, Budapest.

Bódis et al. (2006): Munkanélküli-ellátás és hatásvizsgálatai Magyarországon. Magyar Tudományos Akadémia Közgazdaságtudományi Intézet, Budapest.

Dávid J. et al. (2011): A foglalkoztatás-, és munkaerő-piaci politika információs háttere.(Háttértanulmány) 3K Consens Iroda, Budapest. Forrás: http://www.employmentpolicy.hu/ resource.aspx?resourceID=131_ fogl_kutatasi_adatbazis (Letöltés ideje: 2019-09-15)

EGRI Z. – TÁNCZOS T. (2016): Spatial Layers and Spatial Structure in Central and Eastern Europe. Regional Statistics, Vol 5, No 2. 2015: 34–61.

EGRI Z. – KŐSZEGI I.R. (2018): A gazdasági-társadalmi (komplex) térszerkezet kelet-közép-európai képe. Területi Statisztika, 2018, 58 (1): 27–56.

Fazekas K. – Varga J. (2015): Munkaerőpiaci Tükör 2014. Magyar Tudományos Akadémia Közgazdaság- és Regionális Tudományi Kutatóközpont Közgazdaság-tudományi Intézet, Budapest.

Fehér I. (2009): A munka világa. Fogyatékos Személyek Esélyegyenlőségéért Közalapítvány, Budapest. Forrás: https://nfsz.munka.hu/Lapok/archivum_programok/full_tamop_222/afsz_tamop222_szakanyag/ content/afsz_tamop222_szakanyag_online_feher.pdf (Letöltés ideje: 2019-09-20)

FEJES L. ET AL. (2006): A foglalkoztatás és munkanélküliség területi különbségei az elmúlt 55 évben. Központi Statisztikai Hivatal Miskolci Igazgatóság, Miskolc.

Földesi E. et al. (2006): Munkaerő-felmérés módszertana, Statisztikai módszertani füzetek 46. KSH Életszínvonal- és emberierőforrás-statisztikai főosztályának Munkaügy-statisztikai osztálya, Budapest.

Kaiser T. – Kis N. (2014): A jó állam mérhetősége. Nemzeti Közszolgálati Egyetem, Budapest. 63. p.

Kehl D. – Sipos B. (2011): Excel parancsfájlok felhasználása a statisztikai elemzésekben. Pécsi Tudományegyetem, Pécs.

KISS J. P. – NÉMETH N. (2006): Fejlettség és egyenlőtlenségek – Magyarország megyéinek és kistérségeinek esete. Magyar Tudományos Akadémia Közgazdaságtudományi Intézet, Budapest. 9. p.

Kleiber K. (2007): The Lorenz curve in economics and econometrics. University of Basel Center of Business and Economics (WWZ), Basel.

Kövér Á. (2012): Egyenlő bánásmód és esélyegyenlőség a foglalkoztatáspolitikában. ELTE Társadalomtudományi Kar, Budapest.

LIPTÁK K (2014): Változó munkaerőpiac? Munkaerő-piaci előrejelzés Észak-Magyarországon. In: Területi Statisztika 54 (3) pp. 220

MAGYAR KÖZLÖNY (2019): A fővárosi és megyei kormányhivatalokról, valamint a járási (fővárosi kerületi) hivatalokról szóló 86/2019. (IV. 23.) Korm. rendelet, In: Magyar Közlöny 69. szám pp. 2358-2424. Forrás: https://magyarkozlony.hu › dokumentumok › letoltes (Letöltés ideje: 2019-09-10)

NAGY GY. (2011): Bevezetés a munkaerőpiacok empírikus elemzésébe. Budapesti Corvinus Egyetem, Budapest.

Rodenburg P. (2007): The remarkable palce of UV-curve in economic theory Tinbergen Institute Discussion Paper, University of Amsterdam, and Tinbergen Institute, Amsterdam. 34. p.

Tóthné Sikora G. (2002): Munkaerőpiaci ismeretek. Jegyzet, ME-GK Humán Erőforrás Tanszék, Miskolc.

# „INFOCOMMUNICATION, DIGITIZATION, AUTOMATIZATION IN RURAL SPACES" SECTION

# COMPUTER SCIENCE FOR AGRICULTURAL STUDIES

*Gergely BUDAY[1]*

[1] Eszterházy Károly University Károly Róbert Campus Gyöngyös
Gyöngyös H-3200 Mátrai út 36. buday.gergely@uni-eszterhazy.hu

## Introduction

It is common knowledge that digitalization has a new wave in agriculture with precision agriculture, geographical information systems, digital marketing and more. All these a changing rapidly, giving a lesson to the educator: what to teach for agricultural students, both at the undergraduate level and at the postgraduate or life-long learning level. What is a timely knowledge in Information Technology and especially Computer Science that gives a solid background for the everyday challenges in agriculture?

## Literature review

In this paper I continue and specialize my work on IT tools for rural development (Buday, 2019). In the public opinion rural development and agriculture are synonyms but they are definitely not the same thing. For looking at the IT needs of agriculture, agricultural students and professionals I carried out an interview with Andrea Ambrus (Ambrus, 2019).

She expressed that agricultural professionals should be capable of keeping pace with agricultural digitization, precision agriculture and geographical information systems. On the low-end side, she mentioned the use of e-government sites, that landowners should be able to manage their European Union and government support. In general, how to handle databases, how to understand them, how to query and use the data for agriculture.

An important issue is the case for telecommuting and in general how to organise office work at home: what telecommunication equipment, software and knowledge is important for that – and in what areas can it be used. What is the international experience with that, what to pay attention for to be successful.

Government grants are essential, and not only the existing grant schemes but to think about what is needed to go forward in digitization, especially for education institutions. An important issue here is the clear distinction on the goals of second and third tier education in this area. What equipment – e.g. drones – should an education institution should buy, what software, and how it can cooperate with agricultural companies.

E-government sites are diverse and changing, so it would be important to have an online learning system to instil the basic skills of using those into students – obviously they cannot use the live sites to practice things. Here the agricultural public administration is in focus.

Making economic analyses is of outmost importance, the agricultural professionals should be able to work on their own in processing data and to act upon them.

It would be important to make it mandatory for grants to attend an information technology course.

This is to mitigate the case that most agricultural workers are aged and do not have the necessary computer skills – now the employees of the National Agricultural Chamber, the extension officers should help them in doing the administration for EU and government land support.

There is a vast amount of international experience on the above: how can we apply them in the local setting?

Concerning agricultural digitization, Trendov et al. (Nikola M. Trendov, 2019) starts with the estimation that in 2050 there might be 9.6 billion people to feed, where land and water becomes constrained. For that, a more productive, efficient, sustainable, inclusive, transparent and resilient food systems are required. Digital technology may be part of the solution. In agriculture, information technology comes as mobile technologies, remote sensing and distributed computing. They improve smallholders' access to information, inputs, market, finance and training. There are challenges though. There is a digital divide: in emerging economies and rural areas with weak technological infrastructure but high costs, low level of digital literacy and limited access to services leads to the risk of left behind. On the good side, sometimes a jump is possible, skipping already outdated agrifood technologies. The new digitized agriculture will be based on big data and everything will become traceable and coordinated.

Trendov et al's paper emphasizes the digital technical and human infrastructure which I also covered in (Buday, 2019). But there are caveats: rural areas are declining in population and schooling and jobs are scarce. Also, the access to telecommunication networks and the Internet is less and less reliable as we are leaving urban areas.

They emphasize the literacy and numeracy and technical skills. The education in rural areas might be less developed and as kids are required to work that lessens the effect of education. But digital literacy will be a requirement for agrifood jobs. Trendov et al. (Nikola M. Trendov, 2019) mention the lack of scholarly research on government digitalization policies. As an enabler of digital agriculture transformation, they mention agricultural extension officers.

The use of the Internet is stronger in the developed world and in urban areas, so in rural areas of less developed countries it is not prevalent. In those areas mobile telephony is the access to information services, mainly for personal communication, social media and entertainment. That poses a challenge on how to teach advanced digital skills. An improved information flow between farmers is needed that could help better farming decisions for increased production, better environmental effect and improved livelihoods.

An important technical problem is the wide variety of technologies and data formats, the lack of standardisation and compatibility between them. This leads to vendor lock-in (Wikipedia, 2019) and they lack independent advisors.

The digitalization process will alter the agrifood skill set. There is an agripeneur culture, especially within young people: in Italy, over 12 000 agricultural start-ups were created in 2013 by people aged 25 to 30.

For the use of digital technologies in agrifood systems, they mention
•price information delivered by mobile applications that can reduce market distortions
•agrirobots to measure, map and optimize irrigation
•real time livestock disease reporting
•weeding robots
•guidance systems in precision agriculture to save seed, fertilizer, fuel costs and working hours
•enterprise resource planning for agriculture
•artificial intelligence for remote sensing, predictive models and monitoring
•artificial intelligence to monitor the health of pigs
•Walmart tracks lettuces from farms to supermarket by blockchain

Precision agriculture (PA) is the measuring and acting upon collected detailed data on farms and livestock (European Parliament, 2014) .  It can reach better yields and/or profitability. Other advantages can include better working conditions and better treatment of animals and the environment, in one word: sustainability.
Precision agriculture stems from sensor networks and remote sensing and using their data to create models of agricultural production.  The most advanced PA systems are run on large grain farms in Europe, USA and Australia. Optimising irrigation is a main concern as water shortages are a frequent phenomenon. Precision livestock farming (PLF) is the monitoring of animals and milk and egg production. A non-technical definition for precision agriculture is to "apply the right treatment in the right place at the right time".
A main source of information is from remote sensing from airborne and satellite platforms, e.g. unmanned aerial vehicles (UAV), commonly called drones. This collected data is processed through geographic information systems (GIS). This European Parliament document lists the technologies used in precision agriculture. Just to name a few,
    -machine guidance for field operations, realised by driver assistance and even automatic driving
    -machine vision systems, guaranteeing safety and security of food
    -remote sensing for learning nutrient deficiencies
    -using the same tracks to minimise soil compaction

In arable lands, it is important to optimise the use of Nitrogen, Phosphorus and Potassium as fertilizers. For some tasks the auto-steering needs high accuracy global navigation satellite systems of 2-10 cm.
Dubois et al (Michel J. F. Dubois, 2019, pp. 276-303) investigates agricultural innovation from not only a technological point of view but also consider business model innovation. They focus on how farmers can increase their share in the value chain of agricultural productions. There is a constraint from global population growing: on one hand farmers should decrease the inputs: pesticides, fertilizers, energy and soil cultivation while on the other hand they should increase the production using the same area of land. They should pay attention to waste, water, its quantity and quality, and biodiversity should be kept.

The authors consider at length an important type of innovation that should take place in the digitalization process: business innovation. Farmers are reluctant to do business innovation, they want to maintain their traditional business models. It is, of course, a question whether they can do that in the long term. There are emerging agricultural start-ups, founded by young agricultural graduates.

Dubois et al consider precision farming not a static concept, but an evolutionary process. The when is not predictable: geolocalization, geographic information systems, sensors, controlled traffic farming, agricultural production management software, big data systems, decision support tools and artificial intelligence came at unseen dates. Sensors are used for measuring at different wave lengths the level of humidity, temperature, soil ion concentration, soluble fertilizers, and density of living organisms. The greenhouse was an early adopter of computer control for lightening, sprinkling, watering, drip irrigation and temperature control. Robotization comes in agriculture to replace manual work. Accessing market data through the web as an important step in digitalization. Agriculture is at the end of computerization innovation chain: technologies appear first in the military, then in banking and insurance, pharmacy, aeronautics, automobile, food industry, and only then in agriculture. This is due to the fact that the added value of it is small in agriculture. The technologies used in agriculture are not technological innovations, just reframing or reconstruction of existing and elsewhere tested technologies. The agronomic axis is low-cost sensors and mobile technology enables the implementation of precision farming.

They describe an IoT in smart farming bootcamp that helped agriculture professionals to gain the high skills in new technologies in farming digitalization. Topics covered: sensors and electronics, 3D printing and packaging, digital network interfaces, data collection and processing, decision support systems, Arduino systems, wireless networks. The participants expressed their view that it was *"relatively easy to design and implement the most appropriate connected solutions suited to the farmers' needs"* (UniLaSalle, 2017). Dubois et al emphasize the importance of open innovation and open software. Also that artificial intelligence and deep learning is important in analysing the data collected from sensors.

Digitization in agriculture and precision agriculture are the hoped bright future in this field. In an interview with a local agricultural extension officer Szabolcs Tuza (Tuza, 2019) I learned about the present of Hungarian agriculture which uses technology but landowners are sceptical and not willing to risk investment.

He mentioned some unavoidable artefacts of digitization in agriculture, namely, government websites that are important for agricultural entrepreneurs. First and foremost, the Client Gateway for the government websites (Government of Hungary, 2019a) which is a single sign-on (Wikipedia, 2019) solution for accessing e-government sites that require citizen authentication. The most important agricultural sites are Agricultural Plot Identification System (Ministry of Agriculture in Hungary, 2019), where plots are handled, the Széchenyi 2020 website (Government of Hungary, 2019b) which, among others, administers government support for landowners.

Geographical information Systems provider ArcGIS has an online map that has details about agricultural lands in Hungary (ArcGIS, 2019). Agricultural corporation Bayer provides a reliable and detailed, location specific weather forecast service that is useful for agricultural professionals (Bayer, 2019).

An important range of websites are where agricultural producers can sell their products (Jófogás, 2019) (Agroinform, 2019) (Mgapro, 2019) (Magro, 2019)

There is a need for computer security training, it might occur that uneducated users leave the computer logged in to some administrative site that allows unwanted changes. Buying hardware is critical as not technical people can buy outdated computers at high prices. An education is important here. For e-mail, not only the technical nature of it is an obstacle but that landowners don't want to spend too much time with computers and do not realise that they can get important e-mails from local and central government that require timely feedback. At all, they are reluctant to do anything other than farming, not even go out of their village.

Agricultural extension officers use SAP for Enterprise Resource Planning as the Hungarian Government sanctions it for every branches of its operations. There is a network of agricultural consultants who are independent of the Agricultural Chamber and do their work on a market basis. They help in administration – landowners of larger, 50-100 ha lands hire them usually. That is valid also for using drones for remote sensing, smallholders are not interested and it would be too costly for them. The experience is that satellite snapshots are a reliable source of information while drone recordings are less so.

For smallholders, the 80's are considered a golden age when even from small plots families could live well. This is not valid anymore, partly due to the price of technical equipment: they are expensive irrespective of land size and so the specific costs can be high on small plots.

**Material and methods**

Dubois et al (Michel J. F. Dubois, 2019) admit their bias as looking at farmers' work as if it were conventional business. My take is different, partly from my personal view, partly from the interview with an agricultural extension officer (Tuza, 2019). Farmers concentrate on production and not the customers and don't look at themselves as a conventional business but a way of life that is self-sufficient. They are reluctant about innovation, both technological and business model innovation. This is especially true for smallholders. If anybody, larger landowners are capable of introducing innovative digital technologies into farming. Of course even smallholders should be able to use the Internet and its business and e-government sites effectively.

To give an overly simplistic view on the technology used in agricultural digitalization: farmers should collect the data, and analyse it. The former needs computer engineering, the latter needs Excel and other data-centric tools and statistics. Agricultural start-ups should build on standard Internet and mobile technologies to reach a wide audience.

Agricultural professionals of any size of lands should have a firm understanding of the security of Internet applications, should have a compliance awareness: timely communication with the authorities, how to procure information technology devices and software.

**Results**

It is obvious that agricultural information technology users need not be software developers, however, they should be power users (Wikipedia, n.d.). Especially, *"In enterprise software systems, "Power User" may be a formal role given to an individual*

91

*who is not a programmer, but who is a specialist in business software"*. The development consultants of the National Agricultural Chamber should bear this formal role, they should provide support for landowners. This should include how to handle databases, geographical information systems, hardware and software procurement, computer security, computer tools for compliance. A general theory of user experience (Wikipedia, 2019b) is important: we cannot teach all existing user interfaces but we should prepare agricultural professionals to be able to handle any, be it a software or a computerized agricultural machine.

For collecting agricultural data, we should teach embedded systems with sensors and electronics. Arduino (Massimo Banzi, 2014) is an open source platform that is good both in education and in practice for agricultural innovation. It can be programmed in C# and Python, two popular programming languages.

Telecommuting is important, for that a basic knowledge of networking and different service providers is essential – also, virtual private networks and the dos and don'ts of remote work organisation. Telecommuting is a first step in job creation.

Digital marketing is an important area for agriculture and digitalization, starting from the simplest agricultural product selling to building food distribution networks. For that classical HTML, CSS and JavaScript is essential.

Arduino was an example of an open source, open innovation platform: using open source software enables agricultural innovators to use widely known software for free and to get help from peers on the Internet. As agriculture is in the end of the computer innovation chain, it builds on best practice technologies so there will be plenty of experience available for open source software. Open data formats for agriculture are important: the now practice is that equipment producers use proprietary formats not allowing the cooperation of different systems.

Machine vision, artificial intelligence, decision support systems and deep learning are in use in many areas outside of agriculture, again an opportunity to learn already tried technologies.

A firm understanding of databases is essential: not the implementation of them but how people organise data and how to query effectively these databases. A special case is geographical information systems where the spatial dimension of agricultural data is well handled.

With embedded systems collecting the data and databases storing them, the last step is analysing that data. For that, mathematical theory and computer tools are needed: statistics, machine learning and Excel, SPSS, R and using Python libraries.

**Conclusions**

The most important thing is to educate agricultural professionals to be power users, to make them understand that information technology is as important for their business as knowing plants, agricultural machines, irrigation, fertilization and so on.

For the high end, we should teach computer engineering skills to collect the data and analyse the date. We should encourage working professionals to learn about the innovative practices.

## Summary

Agricultural digitization takes place at a fast pace with some counter effect from landowners who would like to work in their traditional ways. We should introduce more computer science concepts into agricultural education to let future agricultural professionals realise the most from information technology, to increase their share of value from the agricultural product chain.

**Keywords:** digitization, agriculture, computer science, user experience, infocommunication, automatization in rural spaces

## Acknowledgement

## Literature

Agroinform, 2019. Agroinform Marketplace. [Online] Available at: https://www.agroinform.hu/aprohirdetes/termeny-12759/c1 [Accessed 15 10 2019].

Ambrus, A., 2019. IT skills in Agriculture [Interview] 2019.

ArcGIS, 2019. ArcGIS Webmap. [Online] Available at: https://www.arcgis.com/home/webmap/viewer.html [Accessed 16 10 2019].

Bayer, 2019. Weather forecast. [Online] Available at: https://agro.bayer.co.hu/szolgaltatasaink/idojaras_elorejelzes/ [Accessed: 16 10 2019].

Buday, G., 2019. Information Technology tools for Rural Development (in Hungarian). Gödöllő, Szent István University.

European Parliament, 2014. Precision Agriculture: an opportunity for EU farmers. [Online] Available at: http://www.europarl.europa.eu/thinktank/en/document.html?reference=IPOL-AGRI_NT(2014)529049 [Accessed: 10 10 2019].

Government of Hungary, 2019a. Magyarorszag.hu Goverment Portal Client Gateway. [Online] Available at: https://magyarorszag.hu/

Government of Hungary, 2019b. Széchenyi 2020. [Online] Available at: https://www.szechenyi2020.hu/ [Accessed: 15 10 2019].

Jófogás, 2019. Jófogás product and forage page. [Online] Available at: https://www.jofogas.hu/magyarorszag/termeny-takarmany [Accessed: 16 10 2019].

Magro, 2019. Magro Agricultural Marketplace. [Online] Available at: https://www.magro.hu/ [Accessed: 16 10 2019].

Massimo Banzi, M. S., 2014. Getting Started with Arduino. s.l.:Maker Media.

Mgapro, 2019. Mgapro Classified Ads for Agriculture. [Online] Available at: http://mgapro.hu/cat/termeny-vetel-eladas [Accessed: 16 10 2019].

Michel J. F. Dubois, F. F.-J. J. D. D. R. M. J. L. S., 2019. The Agricultural Innovation Under Digitization. In: W. A. Karim Mezghani, ed. Business Transformations in the Era of Digitalization. s.l.:IGI Global, p. 360.

Ministry of Agriculture in Hungary, 2019. Agricultural Plot Identification System. [Online] Available at: http://mepar.hu/ [Accessed 15 10 2019].

Nikola M. Trendov, S. V. M. z., 2019. Digital Technologies in Agriculture and Rural Areas, Rome: Food and Agriculture Organization of the United Nations.

Tuza, S., 2019. Technology in Agriculture [Interview] (11 10 2019).

UniLaSalle, 2017. Agriculture connectée : un bootcamp sur l'internet des objets dans l'agriculture à UniLaSalle. [Online] Available at: https://www.unilasalle.fr/lasalleactus/agriculture-connectee-bootcamp-linternet-objets-lagriculture-a-unilasalle/
[Accessed: 29 10 2019].

Wikipedia, 2019b. User experience. [Online] Available at: https://en.wikipedia.org/wiki/User_experience
[Accessed 29 10 2019].

Wikipedia, 2019. Single sign-on. [Online] Available at: https://en.wikipedia.org/wiki/Single_sign-on
[Accessed 15 10 2019].

Wikipedia, 2019. Vendor lock-in. [Online] Available at: https://en.wikipedia.org/wiki/Vendor_lock-in
[Accessed: 10 10 2019].

Wikipedia, n.d. Power User. [Online] Available at: https://en.wikipedia.org/wiki/Power_user

# THE ESTIMATION OF DIGITALIZATION IN THE DISTRICT OF A SMALL RURAL CITY BASED ON SOCIAL MEDIA DATA

*Balázs TÓTH*

SZTE, Department of Economic and Social Geography, tothbalazsbmx@gmail.com

## Introduction and literature review

The level of digitalization is a good indicator to measure the spread of information society (Kincsei 2007). This is an important question because people who are not present in the virtual world can be deprived because they lack the connection to one of the most versatile information source and communication platform to communities and other individuals (Foth et al. 2015). Although in the context of recently hegemonic neoliberal capitalism I am not techno-optimistic and I think social media causes more damage than advantage to the society (Fuchs 2014). In this approach I define social media as a techno-social product a consumer good but at the same time a means of production in cultural and economical aspect which exists in the virtual space and builds up of mostly human communication and cooperation networks on a platform provided by companies and the users connecting to it with ICT devices. An important feature of the platforms is the user experience where the present people as a collective sense contribute to the production of the platform's value and surplus value by their labour as they generate content or actions (Castells 1996, Fuchs 2014, Lefebvre 1991, Webster 2014).

Nevertheless such platforms can serve as a good indicator and can be used carefully to nourish communities and social relations (Bőgel 2015, Croitoru et al. 2013, Croitoru et al. 2014). The first crucial task is to gain knowledge about the realms of social media in local contexts.

In this paper I introduce a method which makes it possible to get a more practical measure of digitalization by utilizing social media data. The application of social media in socio economic works is not new it is used in research on tourism, statistics, scale, GIS and competitiveness (Chua et al. 2014, Giczi – Szőke 2017, Jakobi – Lengyel 2014, Ksenia 2017, Ságvári 2019, Stefanidis et al. 2011, Zuti 2018). In my view digitalization is the expansion of digital technology in different aspects of society. It is mainly the expanding virtual aspect of human existence based on devices, network services, data generation, mediatisation and communication (Kincsei 2007, Zuti 2018). The latter parts of digitalization can be measured and that is what I am aiming to do.

The advantage of my method is that it is based on the recent social media use and information about the activity level of individuals and communities instead of static indicators like internet penetration or the number of personal computers or telephone lines in a given population or area (Giczi – Szőke 2017, Pintér 2007, Ságvári 2019). And also what makes my approach more useful is that many people only contacts with the internet through their smartphones which almost always has Facebook pre-installed and a lot of people use it in Hungary and internationally also [1, 2, 3, 6].

In this approach to the topic my goal was to estimate the level of digitalization independently from statistical data. Besides the results I have revealed many other upcoming questions and aspects which I will mention in my paper.

My approach of social issues is based on Marxist critical social theory and I agree with the view that rural cannot be defined as the opposite of urban there are similarities and differences but they both part of the global neoliberal economy. In my point of view one of the most important separating factor is the uneven development (Wallerstein 2010). The evidence of this is that in the flow of capital and in the utilization of new spaces the rural or urban characters does not matter, what matters is the price and the quality of labour (Csurgó 2013). Consequently social media can be used in the explanation of processes and conditions because the processes are similar. Also the virtual space and the social media makes it possible to spread global symbols to any place and by that platforms strengthen many aspects of globalization and it makes people think similarly about themselves and about their locations (Castells 1996, Fáber 2018). Because of the uniformized socio-economic structure rural becomes what individuals think is rural, it becomes a constructed concept (Csurgó 2013). Amongst other sources social media like Facebook and Instagram are suitable for in-depth analysis of the created category of rural and the attached representations and meanings but this is not my goal. My sample area is the Szarvas District and I define it as rural based on its location the high percentage of agriculture in local economy (Kocsis – Schweitzer 2011). In my work I make a preparatory step towards this by defining the level of digitalization and through it some attributes of the people and communities represented on social media.

As data source to my empiric research I have chosen Facebook because it is the most popular social media platform in Hungary and it is commonly used as a tool to organize communities through Groups [6]. My other choice was Instagram because it is the second most popular and it is more popular amongst younger generations so I am able to represent greater amount of the age groups [3]. The use of both Facebook and Instagram is growing in parallel with the growing of internet use (Neokosmidis et al. 2015). I have to mention that there are other platforms like Twitter, Snapchat, TikTok, Musically and many others which are not as commonly used in this country therefore their use has greater limitations [1].

The usage of Facebook amongst middle aged and older generations is relatively high while younger generations tend to use Instagram more [3, 4, 5, 6, 7]. Another distinctive feature of the platforms is that on Facebook one can get more insight in local attributes. Meanwhile on Instagram the researcher is able to have a look at what are the points of interest of individual users and which is an important data (Stefanidis 2011). In my research I was interested in the number and level of activity of social media users and groups.

**Methodology**

I have to outline a number of fundamental statements. My goal was to examine the social media use of virtual communities and individuals in a given time so I did not try to gather every social media user or community that exists in the sample area which I am not even able to do due to the possibility to set the page, group or account to private, which means only certain users can see it.

Another constrain of my search is that the selection was based on location, consequently posts without the location tags of the settlements were excluded which means the majority of posts (Croitoru 2013, Stefanidis 2011).

Although the visible data is public it can also be sensitive and because of the small size of settlements and user numbers due to research ethical reasons because of that to maintain the privacy of users, groups and pages I have collected and stored data anonymously in the case of Facebook and Instagram.

In my empiric work I have collected primer data from social media sites which I have generalized to indexes that I have correlated to official statistical data on internet penetration. But before processing my empirical data I had to outline some aspects of the digitalization of the sample area based on official statistics. I took wideband internet penetration as fundamental index of digitalization and correlated it to a control data set which I have assembled based on my experiences. The data set contains the number of permanent population, accommodation service provider per 100 capita, personal income tax base per permanent resident and the percentage of population below 35 years of age.

**Facebook**

My examination of Facebook is based on two elements of the platform which are the visible pages and groups that can be linked to the settlements by location or name. In general Facebook represents the local connections and relations (Stefanidis 2011, [6]) therefore it is useful in measuring the digital footprint of local communities and organizations. The two entities that I have used on Facebook are the Pages, which has a top down structure and can generate one-to-many and to some extent many-to-many communication like the fan page of a local restaurant where customers can share their thoughts to each other or to the owner of the page. The other entity is the Group which has a bottom up structure and the main goal is the many-to-many communication like flea markets which is a popular type of group in the district. According to a survey about Hungarian users the second most popular feature of Facebook is the Pages. 55.73% of users follow a Page. Groups are also popular, 34% of the responders mentioned that Groups are useful in forming thematic communities [6].

Many attributes of Facebook pages can be analysed such as their theme, the level of activity, direction of communication, emerging topics and so on. To estimate the level of digitalization I have calculated with attributes of pages and groups and compared them to the population of the given settlements in the district.

I have gathered and summed data about the sizes of communities the number of likes they have and the frequency of posts in case of groups. In the next step I have compared the values to the population of each settlement. The first task was data cleaning, because many groups are inactive because so I have sorted out the inactive groups and worked only with active ones. There were 242 groups in the district whereof only 69 were active. Using this I have created three main indexes, the active group membership rate on settlement population, the activity per 100 active group liker and the activity per 100 resident.

The next step of my research was the examination of Pages where I have only collected the number of likes besides of course the number of pages.

The aim of this part of the research was to get information about the digital footprint of the settlement through local actors for example accommodations, restaurants, public

figures, politicians and such. Unfortunately this part was not relevant in answering my question though it contains useful data which can be successfully analysed by quantitative methods.

**Instagram**

The third part of the data gathering was from Instagram. I have collected every post with the location tag of the settlements from the September of 2019. At this point I had to make a decision because there are users who are surely do not live in the sample area. I have chosen to leave them in the database because it reflects that the area has utilisable potential in the development of digitalization and this presence of social media users can influence the locals in the use of the mentioned applications.

I gave a code number to the users so my database is anonym. I have registered how many posts, followers and followings has each user and how many times they have posted through the examined one month period. I have calculated how many percent of the population used Instagram and how often did the users publish a picture or video in the examined month. After it I have created an index to gain information about the intensity of their use of Instagram. The index builds up of three features of the users, the number of posts they published on their profile, the number of their followers and the number of profiles they follow. I took the average of this three attribute per user and after it I have averaged it on settlement level.

**Description of the sample area and results**

The sample district is a LAU1 unit in rural Hungary, the District of Szarvas. The district is located on the inner periphery on the Hungarian Great Plain. There are six settlements in the district Szarvas, Kondoros, Békésszentandrás, Csabacsűd, Kardos and Örménykút with the total population of 28779. According to data from the KSH (Central Statistical Office) the district is above the national average in many indexes such as personal income tax base per permanent resident and also in the internet subscriptions per thousand inhabitants and operating businesses per thousand inhabitants [8]. In the following paragraphs I present my analysis which aims to create a core to the social media based examination of the level of digitalization applicable to any sample area. I have to emphasize that the chosen attributes are all correlate to each other on fairly high level therefore I am not able to and does not try to determine exact causality. My goal is to create indexes that has high correlation level with internet penetration which is a basic measure of digitalization independently from official statistics.

The social media use rate in the district of Szarvas based on Instagram and Facebook Groups and Pages is about 2,56 %. This represents a seemingly narrow slice of the population but this is all the available data with my search method and it can considered representative on the social media user population. According to official statistics the basic wideband internet penetration has a correlation coefficient to the percentage of population under 35 years of 0,935. And the wide band internet with speed over 30 Mbps has a correlation to the accommodation providers per 100 inhabitant of 0,808 and to the percentage of population below 35 years of 0,838 as shown on Table 1.

The data shows that the size of the settlements, the volume of tourism so the presence of tourists and the income of the residents does not correlate to the internet penetration on a high level. The only experienced covariance was with the proportion of younger

generations on the settlement population which is evident. The conclusion here is that possibly my indexes which builds up only from social media data will reveal a relevant correlation because there were no correlation with the control data set.

| | | Population | Accommodation service provider per 100 resident | Income tax base per resident | Percentage of population under 35 years |
|---|---|---|---|---|---|
| Wideband internet penetration rate | Pearson Correlation | 0,634 | 0,630 | 0,520 | ,935[**] |
| | Significance | 0,176 | 0,180 | 0,291 | 0,006 |
| Wideband internet with speed higher than 30 Mbps | Pearson Correlation | 0,635 | 0,808 | 0,676 | ,838[*] |
| | Significance | 0,176 | 0,052 | 0,141 | 0,037 |

Table 1. Correlation of Internet penetration and my control parameters (Source: [9])

Through the course of my work I have experienced that the gathered data from 170 Facebook Pages with 205966 likes does correlate with the internet penetration data but it has a greater correlation with my control variables as you can see it on the Table 2, therefore I did not use them in answering my main question. The number of group likes correlated with the population of the settlements and the number of group likes per inhabitant has correlated with the number of accommodation providers per 100 inhabitant. So this data could have relation to tourism more precisely to the virtual appearance for example of hosts and restaurants and it is also useful in describing the social media characteristics of the settlements.

I was more successful with Facebook Groups. I have collected data from 242 groups whereof 69 were active. Out of my three indexes the active group membership rate on settlement population and the activity per 100 resident had high correlation with internet penetration types but had higher with accommodation providers per 100 inhabitant as in the case of the control data set. The activity per 100 active group liker with 0,899 correlation to wide band internet penetration rate and 0,834 correlation with 30 Mbps and faster internet connection rate seems to be a good index to measure digitalization as you can see it on the Table 2.

As it was in the case of control data my Facebook digitalization indexes also correlate to the presence of younger generation but my index does not correlate to the number of accommodation providers therefore I think it shows a different dynamic. The Facebook Group based index also shows correlation to the Population number control data which is I think the consequence of the fact that in the district the most active groups are flea markets which will probably have more member in bigger settlements. I think this can be different in bigger or specific settlements. Also a probability similar to the Maslow pyramid where needs build up on each other starting with basic ones.

I think Groups with functions connected to basic topics occur in smaller settlement and with growing number of inhabitants, the number the population and the diversification of groups should also rise. The examination of this quality of virtual space also offers a good use of social media.

| | | Wideband internet penetration rate | Wideband internet with speed higher than 30 Mbps | Population | Accommodation service provider per 100 resident | Income tax base per resident | Percentage of population under 35 years |
|---|---|---|---|---|---|---|---|
| Group activity per 100 group liker | Pearson Correlation | ,899* | ,834* | 0,809 | 0,481 | 0,499 | ,980** |
| | Significance | 0,015 | 0,039 | 0,051 | 0,334 | 0,314 | 0,001 |
| Intensity of Instagram use | Pearson Correlation | ,912* | ,883* | 0,342 | 0,543 | 0,485 | ,822* |
| | Significance | 0,011 | 0,020 | 0,507 | 0,265 | 0,329 | 0,044 |

Table 2. *Correlation of social media use indexes and official statistical data (Source: [9], Facebook, Instagram)*

After discussing the Facebook data I interpret the results of the Instagram research. According to my empirical data the percentage of Instagram users on settlement population correlates to the accommodation providers per 100 inhabitant with 0,922 at 0,009 significance level. This correlation can be the consequence of tourists posting in the examined locations but I was able to filter out this index with the help of my control data set.

The average usage intensity index of Instagram is applicable because as it is seen on Table 2. it only correlates with the presence of younger generations which correlation was discovered before and of course with internet penetration on very high level. According to the correlation values this connection is the strongest between social media and internet penetration. And since both of my indexes are based solely on social media data, population data does not interfere with them. I must emphasise that I have only discovered correlation and not causation by any means.

**Conclusion**

The main question of the research was that is it possible to determine the level of digitalization based on social media data independently from statistical data. The need for this new approach stems from the idea that internet penetration data is too static and it is not available at any point of time on micro scale. Meanwhile social media is a living entity and it constantly produces processable data providing the opportunity of complex research. The other advantage is that Facebook and Instagram data contains information about real use of digital devices and data communication therefore it has more implicit knowledge about the virtual space social media use and virtual space use of people.

My work serves with valuable new insights to the phenomena of digitalization. The paper revealed that social media use has a strong connection to digitalization.

I have created two indexes one about the use intensity of Facebook groups and another about the intensity of Instagram use based on the settlements of the sample District of Szarvas. They both correlate to wide band internet penetration on a very high level independently from the control variables therefore my indexes are able to indicate the

digitalization and by widening the range of indicators it can generate more knowledge about the virtual space.

**Keywords:** social media, digitalization, rural, social geography

## Literature

Bőgel Gy. 2015: A Big Data Ökoszisztémája. Typotex Kiadó, Budapest. 216 p.

Castells, M. 1996: Az információ kora: Gazdaság, társadalom és kultúra. I kötet: A hálózati társadalom kialakulása. – In. Pintér R. (szerk.): Az információs társadalom – Az elmélettől a politikai gyakorlatig 2007. Gondolat – Új Mandátum, Budapest. pp. 11-29.

Chua, A. – Servillo, L. – Marcheggiani, E. – Moere, A. V. 2016: Mapping Cliento: Using geotagged social media data to characterize tourist flows in southern Italy. – Tourism Management 57. pp. 295-310.

Croitoru, A. – Crooks, A. – Radzikowski, J. – Stefanidis, A. 2013: Geosocial gauge: a system prototype for knowledge discovery from social media. – International Journal of Geographical Information Science 27. 12. pp. 2483-2508.

Croitoru, A. – Wayant, T. –Crooks, A. – Radzikowski, J. – Stefanidis A. 2014: Linking cyber and physical spaces through community detection and clustering in social media feeds. – Computers, Environment and Urban Systems 53. pp. 47-64.

Csurgó B.: 2013. Vidéken lakni és vidéken élni. Argumentum Kiadó, Budapest. 291 p.

Fáber Á.: 2018. Pierre Bourdieu: Elmélet és Politika. Napvilág Kiadó, Budapest. 288 p.

Foth, M. – Brynskov, M. – Ojala, T.: 2015. Citizen's right to the digital city – Urban interfaces, activism, and placemaking. Springer, Singapore. 259 p.

Fuchs, C. (2014), Social Media a critical introduction. Sage, London. 293 p.

Giczi J. – Szőke K.: 2017. Hivatalos statisztika és a Big Data. Statisztikai Szemle. 95. 5: 461-490.

Jakobi Á. – Lengyel B. 2014: Egy online közösségi háló offline földrajza, azaz a távolság és a méret szerepének magyar empíriái. Tér és Társadalom 28. 1. pp. 40-61.

Kincsei A. 2007: Technológia és társadalom az információ korában. In. Pintér R. (szerk.) 2007: Az információs társadalom – Az elmélettől a politikai gyakorlatig. Gondolat – Új Mandátum, Budapest. pp. 47-64.

Kocsis K. – Schweitzer F.: 2011. Magyarország térképekben. MTA, Földrajztudományi Kutatóintézet, Budapest. 248 p.

Ksenia D. Mukhina – Stephan V. Rakitin – Alexander A Visheratin: 2017. Detection of tourists attraction points using Instagram profiles. Procedia Computer Science (108C): 2378-2382.

Lefebvre, H. 1991: The production of space. – Basil Blackwell. Oxford. 464 p.

Neokosmidis, I. – Avaritsiotis, N. – Ventoura, Z. 2015: Assesment of the gap and (non-)Internet users evolution based on population biology dynamics. – Telecommunics Policy 39: 14-37.

Ságvári B.: 2019. Tér és Társadalom a Big Data szemüvegen keresztül. Területi statisztika 59. 1: 27-48.

Stefanidis, A. – Crooks, A. – Radzikowski, J. 2011: Harvesting ambient geospatial information from social media feeds. – GeoJournal 78. 2: 319-338.

Wallerstein, I.: 2010. Bevezetés a világrendszer-elméletbe. L'Harmattan Kiadó, Budapest. 221 p.

Webster, F.: 2014. Theories of the Information Society. . Routledge, London, New York. 417 p.

Zuti B.: 2018. Digitalizáció felsőoktatás és regionális versenyképesség. Társadalmi problémaérzékenység Szakmai megoldáskeresés. PEME XVI. PhD Konferencia 2018. április 11.: 328-336.

Online sources:
[1]    https://www.pewresearch.org/global/2018/06/19/3-social-network-adoption-varies-widely-by-country/ SOCIAL MEDIA INTERNET AND SMARTPHONE
[2]    https://www.pewresearch.org/global/2016/02/22/smartphone-ownership-and-internet-usage-continues-to-climb-in-emerging-economies/
[3] https://www.crane.hu/down/magyar_instagram_korkep_30.pdf
[4] https://www.crane.hu/down/magyar_instagram_korkep_2016.pdf
[5] https://www.crane.hu/down/magyar_instagram_korkep_2015.pdf
[6]http://besocial.hu/wp-content/uploads/2018/09/be_social_szmo_nagy_facebook_korkep_180918_adatok.pdf
[7] https://www.pewresearch.org/fact-tank/2019/09/09/us-generations-technology-use/
[8] https://www.ksh.hu/teruleti_adatok_menu

[9] https://www.teir.hu/

# OPPORTUNITY OF DIGITALIZATION FOR MAPPING SUPPLY CHAINS OF THE HUNGARIAN GRAPE WINES

*Balázs DURAY* [1] *– Krisztián JÁRDÁNY* [2]

[1] Szent István Universty Faculty of Agricultural and Economic Sciences, Tessedik Campus.
duray.balazs@gk.szie.hu
[2] Szent István University Enyedi György Regional Sciences PhD School, Gödöllő, Páter Károly u. 1.
krisztian@borvar.hu

**Introduction**

Nowadays, the Hungarian viticulture and the wine sector closely linked to major national economic factors, according to statistics, it has long been one of the largest employers in the domestic agricultural sector. In Hungary there are 60,000 winegrowers and more than 6,000 wineries registered in 7 wine regions and 22 wine districts (Szamosköziné Kispál 2018). The domestic viticulture has been continuously developing for the last 10 years. Between 1990 and 2011, Hungary's vineyard area decreased from 111 thousand hectares to 76 thousand hectares, which corresponds to a 32% decline (Györe, 2014). While wine grape production in Hungary increased by 18.17% between 2011 and 2018, domestic wine production increased by 49.39% (hnt.hu 2019). Domestic wine exports increased by 118.7% from 586751 hectoliters to 1283677 hectoliters. Imports of wine have fallen by only 85.9% since 2011 (National Council of Mountains ...). Hungarian wine production satisfies the growing domestic consumption of wine (KSH 2019).

The Hungarian viticulture and wine sector plays an important cultural, tourism, gastronomic and social role, and therefore the potential of local and regional economic development in the sector can be decisive in the process of restructuring and strategy of the wine-growing and wine-growing areas. These processes are closely aligned with the guidelines of the Common Agricultural Policy of the European Union, with a view to maintaining and raising the standard of living of farmers and of rural society in the grape and wine sector, and to strengthening the sustainability of the countryside. Recognizing the positive social and economic effects of the grape and wine sector, domestic policy makes the sector of strategic importance (National Rural Strategy 2012-2020, Digital Agricultural Strategy - DAS).

Sectoral development goals are supported by rural and local economic development instruments and innovative digital options that are also effective in responding to economic and agricultural challenges. Digital innovations and digital databases applied in agriculture and food industry (and decision-making information systems based on them) can be a stable pillar for the efficiency and profitability of Hungarian agriculture, including the grape-wine sector.

The following factors justify the review of the efficiency of the management structures used in the wine sector (Sidlovits, 2008) and the development of innovative digital systems: structural changes in the Hungarian wine sector since the change of regime, changes in market trends and wine consumption patterns. changes, the differentiation of

products according to their specific characteristics, the characteristics of the support system and the global changes in the international wine market.

In the course of our research, we examined whether there is an interface in the specific legal environment of the grape and wine sector, in particular in the protection of origin, and in the reporting obligations related to excise and food chain security regulation, to digital tracking of product lines of grape and wine products.

**Literature review**

Domestic winegrowers and winemakers face the same problems and challenges as their European counterparts, in particular the recurring difficulties in selling, the increasing competition in the market and the structural crisis in wine production. The basis for a more efficient organization of grape-wine product chain networks is the differentiation of agricultural products, the promotion of quality products, the risk of returning investment needs and higher added value, and the minimization of coordination costs related to product line transactions (Sidlovits, 2008). Szamosköziné Kispál (2018) showed that in the domestic wine grape sector, due to the effects of the vintage and changes in the external economic conditions, the purchase price of wine grape changes year by year with decreasing tendency, and that even better grape prices yield only minimal profit average for winegrowers, which endangers long-term survival and retention of plantation size. In contrast, the market and price of quality wines is steadily rising and its performance indicators are stable (NAIK). This encourages stakeholders in the sector to appear with high value-added, quality-price-proportionate wines that can be sold in large volumes, targeting high-volume market channels (Sidlovits, 2008). In addition, smaller wine producers may want to enter the market with their highly specialized and high value-added products, as some markets (primarily the gastronomic segment) explicitly require them, and companies with fewer products are in a higher price segment (Outreville 2011). High price can be a quality strategy for a small company based on a niche market.

Erdős - Ormos (2011) examined investing in quality wines as a real investment alternative. Their analysis concluded that investment-grade wines can play an important role in diversifying individual portfolios because of their low correlation with the stock market and, in the long term, the two markets being independent of each other. The role of diversification is reinforced by the fact that quality wines, even in times of recession, are worthwhile and can provide a haven against volatile stock markets. Coelho-Rastoin (2005), who has invested in the grape-wine sector, has concluded that access to distribution channels is one of the keys to the success of wineries and that distribution is scattering and distributive. The sales (market) channel is the interconnected system of product paths and freight paths, including the stations connecting the producer to the consumer. This is also called a distribution, commercial channel (Tomcsányi, 1988).

Studies have been conducted on the mapping and analysis of domestic sales channels of Hungarian wines at national and wine region level (to be exhaustive: Konkoly-Papp (2011), Györe (2014), Pallás (2017), Szamosköziné Kispál (2018)). These studies focused primarily on economics, commerce and marketing, and outlined several sales channels and their systems with scientific basis. When examining the grape-wine product chains, we focused on digitization opportunities deriving from the Hungarian legal background applicable to the sector.

DAS encourages the development of professional service systems capable of analyzing regional, national, and international data, information, and setting up a back-end system for the integration of production, plant, and product chain systems, providing broad access to market data and information decision support needed to achieve market benefits.

**Material and methods**

In addition to the food chain safety licenses, the wine merchant is obliged to keep numerous records. Wine making itself is subject to licensing. In our research we studied the legal sources of the EU and Hungarian sectoral regulations, of which we analyzed in particular:

- the rules of winemaking, the origin and origin protection of wines,
- the marketing of wines (certificates of origin, marketing authorization, wine certification, etc.),
- data and record keeping (producers 'reporting obligations, cellar-book, accompanying documents, etc.),
- the operation of wine-communities,
- sectoral standards for excise duties on wine products
- the legal requirements of the excise license holders' reporting obligations,
- the statutory provisions applicable to the administrative departments of the vine and wine sector.

In these sources we searched the connection points for the digitization mapping of the domestic grape wine product chain. In the framework of the primary research, we conducted semi-structured in-depth interviews with several relevant industry representatives: two presidencies of the National Council of Mountain Communities, experts of the National Chamber of Agriculture, Borkereskedelmi Kft is an excise licensed employee of the wine trade dealing with excise specialty.

**Results**

Based on in-depth interviews with the stakeholders of the sector, it can be concluded that there is a significant demand for a uniform and real-time digital mapping of the Hungarian wine product sales channel network. The most important of common interests are more efficient allocation of resources allocated to the sector's support system, more precise development, implementation and more accurate measurement of results at wine region levels. Respondents stressed that more effective use of origin protection would allow for more efficient use of internal resources. This is especially true for increasing the efficiency of smaller actors and thus ensuring their long-term presence in the market.

The production of grape wines in Hungary - in line with the European Union norms - takes place in a highly regulated framework. In the case of grapes from domestic areas, the International Organization of Vine and Wine (OIV) shall issue a certificate of origin for the grapes harvested from the areas registered by the OIV at the request of the producer. This certificate shall contain details of the production area, date of harvest, harvested quantity and its individual parameters (variety, type of harvest, potential alcoholic strength, etc.), in the form of a lot number. It shall also indicate the future use of the grapes and the wine qualifying for the highest category of protection of a specific

origin. The OIV maintains this data in its records in accordance with its statutory obligations. In addition to the certificate of origin, the OIV shall issue a certificate of origin for the wine products obtained from the grapes harvested, including the origin of the wine product on the basis of the certificate of origin, its product category, designation of origin, technological and food parameters.

It should be emphasized that, if the place of origin of the grapes or the place of production of the wine product is different, it must be clearly legible on the certificate of origin of the wine. OIV also maintains this information in its records.

Depending on the purpose of the application, the winery may, depending on the purpose of the certificate of origin, store the wine products at the premises of the excise licensee (usually a tax warehouse), transport it to a tax warehouse in another wine-community or decide to commercialize it. Wine, as an alcoholic beverage, is also subject to excise legislation. Wine products may only be marketed with a marketing authorization, which is granted exclusively by the National Food Chain Safety Office (NFCSO). Applications for marketing authorization must be accompanied by a certificate of origin of the wine, the organoleptic results of the Local Wine Selection Committee for a protected product and a sample of the wine to be authorized for analytical and organoleptic analysis. If applicable, the NFCSO will issue a marketing authorization for the quantity applied for, as well as an alphabetic identifier (eg ABCD) of the four characters associated with the license, which shall be compulsory on all commercial wine items. Nebih maintains records of the data it obtains during the licensing process and the analytical parameters it measures. Tax warehouses, as stockists, are required to keep a record in their cellar book of which product of the NFCSO code is sold to whom and where it is sold. A declaration is made once a year, which is sent to the OIV, which forwards it to the National Tax and Customs Administration (NTCA). If the tax warehouse sells its wines to an excise warehouse, it will remain on the wholesale market. Excise warehouses must keep a customer record, which contains the details of the purchaser and the excise items sold to them, together with their NFCSO identification. It is necessary to report monthly to the NTCA on the customer register (stock changes of excise license traders). It is important that sales channel returns, irrespective of how many wines go through, are compulsory for the members of the sales channel until the products are released for retail sale. That is, until the last distributor of excise licenses sells the wines to another unauthorized company or individual. What matters here is the rule that a retailer may sell wine products only to a private individual and not to another retailer.

## Conclusions

The product chain system for wines is practically regulated from vineyard to glass, and a particular wine could be traced back to the very precise location of the grape harvesting the wine, if the system of declarations and records related to the product chain could be integrated between different authorities. Our research has shown that this common denominator already exists in the current system. The NFCSO code is obligatory to accompany the wine to the point of last sale and when the code is issued, the NFCSO records all relevant information that was included in the OIV systems.

The NSRIF identifier can be used to create a unified digital application that integrates the specific data content of different sectors, as well as to accurately define the life cycle of wines. Another benefit of the application is a real-time study of the spatial and temporal evolution of wine retail and wholesale, thereby developing a more precise regional and sectoral planning methodology and ultimately supporting the plans formulated in the DAS.

**Summary**

In our research, we analyzed in-depth interviews with market actors and specialized authorities related to certain grape wine sectors, and analyzed the existing sectoral legislation related to the sector's product chain to see if there are opportunities in the Hungarian grape wine sector that allow its digital mapping. We have concluded that the various authorities record all the data for this, but separately. There is an identifier among the data recorded in the wine product chain, which can be used in an integrated and digital way. This digital system integrated based on the NFCSO identifier would be able to provide the basis of the professional service system formulated in the Digital Agri-Strategy Strategy in the domestic grape wine sector.

**Keywords**: viticulture, wine, regional economic development, digital innovation, digital database

**Literature**

COELHO, A. – RASTOIN J. (2005): In money veritas? Financiarisation et gouvernance des multinationales du vin,in Bacchus 2006: enjeux, stratégies et pratiques dans la filiére vittivinicole ed- Montaigne, E., Paris, Dunod, 2005, p. 53-73.

ERDŐS, P.– ORMOS, M. (2011): Borok, mint alternatív befektetési lehetőségek. In: Közgazdasági Szemle, LVIII. évf. pp. 158-172.

GYÖRE, D. (2014): A közvetlen értékesítés szerepe az egri borvidéken. PhD értekezés. SZIE-GSZDI, Gödöllő. 121 p.

KONKOLY M. – PAPP J. (2011): A tokaji borok elemzése a marketing mix 7 P-je szerint. In: Marketing & menedzsment, (2) 23-34. p.

OUTREVILLE, F.J. (2011): Wine Production in Quebec: an investigation into the price-quality relationship. In: Enometrica 2 (2011). p.7-22.

PALLÁS, E. (2017): Borfogyasztás és borválasztás elemzése kérdőíves vizsgálat és mélyinterjú alapján. In: Árpási, Zoltán; Gurzó, Imre (szerk.) Felelős turizmus: nemzetközi tudományos konferencia Békéscsaba, Magyarország: Alapítvány a Felsőfokú Közgazdasági Képzésért Békés Megyében, (2017) pp. 79-85.

SIDLOVITS, D. (2008): Vertikális koordináció a szőlő- és borágazatban. PhD értekezés, Budapesti Corvinus Egyetem Interdiszciplináris Doktori Iskola, Budapest. 163 p.

SZAMOSKÖZINÉ KISPÁL, G. (2018): A magyarországi bor termékpálya jövedelmezőségének vizsgálata. PhD értekezés. SZIE-GSZDI, Gödöllő. Területi polarizáció és konvergencia a visegrádi országokban Magyar Tudomány 178 (3): 261–272.135 p.

TOMCSÁNYI, P. (1988): Az élelmiszer-gazdasági marketing alapjai. Mezőgazdasági Könyvkiadó, Budapest. ISBN: 9632326075. 458 p.

KSH 2019:

Internet sources:

hnt.hu 2019: http://www.hnt.hu/wp-content/uploads/2019/03/Termoterulet-2011-2018_adat.pdf

List of legislation used:

2019/33/EU, 2019/34/EU, 436/2008/EK, 92/83/EGK, 92/84/EGK regulations

2004. évi XVIII. tv

2016. évi LXVIII. tv

1997. évi XI. tv

2012. évi CCXIX. tv

9/2017. (III. 6.) FM r. a borszőlő telepítésére és kivágására vonatkozó szabályokról 97/2009 FVM r. termőhelyi kataszter

56/2014 VM r. szőlőfajták osztályba sorolása

127/2009 FVM r. nyilvántartások, származási bizonyítvány, borok jelölése, címkézése, borkészítés

25/2010 FVM r. borászati üzemek engedélyezése

27/2011. VM r. borászati nyilvántartás, bizonylatok vezetéséről

49/2017. (IX. 29.) FM rendelet a kisüzemi bortermelői regiszterről

# INVESTIGATION OF THE IMPORTANCE OF KEY COMPETENCES AMONG FUTURE AGRICULTURAL MANAGERS

*Éva TÓTH [1] – Judit POÓR [2] – Gábor LUKÁCS [3]*

[1] University of Pannonia, Georgikon Faculty, te@georgikon.hu
[2] University of Pannonia, Georgikon Faculty, pj@georgikon.hu
[3] University of Pannonia, Georgikon Faculty, lg@georgikon.hu

## Introduction

In the 1980s Klára Szilágyi and Pál Völgyesy investigated the tendencies of agricultural education and the ability of the students in several places, methods and aspects. They discussed the psychological and sociological characteristics, the motivation, the interest, and the value orientation of students. A small portion of the extremely valuable research over many years was re-surveyed, asking the graduates and the students of Szent István University and the University of Pannonia Georgikon Faculty to rank 18 factors. In our study we present the results of the 183 respondents, and compare the results of our research with the results of Szilágyi-Völgyesy.

## Literature review

The demands of the present day pose serious challenges to young professionals preparing for/starting agricultural careers. According to Csehné (2014), thanks to the transformation of higher education into 'mass education' more and more graduates has entered the labor market, which has led to more competition. The positive effect of this expansion was that it met the needs of the labor market, more importantly it opened up the possibility for people from disadvantaged backgrounds and graduated from vocational secondary schools, thus increasing the number of students in the agricultural field for a long time.

Concerning the competencies expected from employees, Kárpátiné Daróczi (2016) synthesized the literature to show that the nature of competences is complex and their mapping and explanation is essential for defining, interpreting and examining competent behavior. Kárpátiné Daróczi (2016) summarized the key features of the competencies as follows:

-Complex - it includes the individual's personality traits, attitudes, motivations, skills and abilities.

-It influences the certain factors of work - it is a fundamental, profound and enduring part of the individual's personality, so in any situation it make the individual's behavior and activity likely during the work.

-Related to work performance - it affects both factors at work and influences the individual's behavior and performance, thus determines the work performance.

-Indirectly measurable - since competence is an abstract concept, therefore only the behavioral manifestations directly or indirectly resulting from it can be accurately measured.

      -Acquirable and improvable - the individual becomes 'competent' through personal and social processes as a result of the learning process; this learning process can be both theoretical and practical, empirical).

In the field of agricultural education, János Nagyváthy (1755-1819), who had already died 200 years ago and established the Hungarian agricultural science, wrote about the expectations and the fields of education in the 'Foreword' of the 'Hungarian Practicus Cultivator' (1821).

The methods available for assessing and analyzing competences and the literature have grouped these features in many ways. Accepting the opinion of Borbély - Pecze - Suhajda (2017) that the definitions and practices of the European Union, adapted to the modern labor market and ways of acquiring knowledge and competences, exceed those applied in Hungary, we use the principles of the European Union. The key competences be set out in the Recommendation of the European Parliament and of the Council on key competences for lifelong learning (2006/962 /EC) are the following:

      -Communication in the mother tongue – Literacy,
      -Communication in foreign language - Multilingual,
      -Mathematical, scientific and technological competence,
      -Digital competence,
      -Learning to learn,
      -Social and civic competence - Citizenship,
      -Sense of initiative and entrepreneurship, and
      -Cultural awareness and expression.
      -For the above eight areas and according to the grouping of literature, the following version of the test framework was compiled (Table 1).

| EU-competence | The examined competence | Type of competence |
|---|---|---|
| Communication in the mother tongue | Comprehension | Personal |
| Communication in foreign language | Foreign language competence | |
| Mathematical, scientific and technological competence | Technological, technical competence | |
| | Numeracy | |
| Digital competence | Digital competence | |
| Sense of initiative and entrepreneurship | Entrepreneurial competence | |
| Learning to learn | Learning | |
| | Problem solving | Interpersonal |
| Social and civic competence | Adaptability | |
| | Communication | |
| | Empathy | |
| Cultural awareness and expression | Connection | |
| | Cooperation | |
| | Conflict resolution | |

*Table 1:* An allocation of competences

**Material and methods**

The research was conducted among students of the Georgikon Faculty of the University of Pannonia. During the focus group interviews, the competencies listed in the column "The examined competences" in Table 1 had to be ranked. A total of 183 people filled in the questions on paper.

**Results**

All competencies, except Digital, were ranked from 1 to 14 on the basis of the answers, which shows that respondents have very different views on the importance of competencies and it is often difficult to rank them. Digital competence was the only one not ranked 1st (see Table 2).

The Minimum (Min) and Maximum (Max) values, the Range (R) that is the difference of the Minimum and Maximum, the Mode – the most common rank (Mo), and the quartile (Q1 – Q2 - Q3) values were examined as statistics describing competency rankings. Quartiles divide the distribution into four equal parts. Of the cut points, the Median (Me) value indicates the rank of the middle responder, ranked by rank. The Interquartile Range (IQT) shows the difference in the ranking of the middle 50% of the respondents. The last column of Table 2 shows the Total that is the sum of the rank numbers.

It would be easiest to make a final order of competences based on the latter (indicated in brackets behind the Total score), but in this case many further conclusions would be missed. However, we should not forget the fact that respondents' opinions are far from uniform in the order of competences, which would provide a good basis for such a final ranking.

| Competences | Min | Max | R | Mo | Me | $Q_1$ | $Q_3$ | IQR | Total |
|---|---|---|---|---|---|---|---|---|---|
| Comprehension | 1 | 14 | 13 | 12 | 10 | 8 | 12 | 4 | 1749 (12.) |
| Foreign language competence | 1 | 14 | 13 | 14 | 9 | 6 | 12 | 6 | 1529 (9.) |
| Technological, technical competence | 1 | 14 | 13 | 14 | 9 | 5 | 12 | 7 | 1554 (10.) |
| Numeracy | 1 | 14 | 13 | 12 | 11 | 8 | 12 | 4 | 1788 (13.) |
| Digital competence | 2 | 14 | 12 | 13 | 11 | 8 | 13 | 5 | 1830 (14.) |
| Problem solving | 1 | 14 | 13 | 1 | 2 | 1 | 5 | 4 | 707 (1.) |
| Learning | 1 | 14 | 13 | 1 | 8 | 4 | 10 | 6 | 1324 (6.) |
| Adaptability | 1 | 14 | 13 | 3 | 5 | 3 | 7 | 4 | 986 (3.) |
| Communication | 1 | 14 | 13 | 2 | 4 | 2 | 7 | 5 | 923 (2.) |
| Empathy | 1 | 14 | 13 | 14 | 10 | 7 | 13 | 6 | 1709 (11.) |
| Connection | 1 | 14 | 13 | 4 | 6 | 4 | 9 | 5 | 1172 (4.) |
| Cooperation | 1 | 14 | 13 | 6 | 6 | 4 | 8 | 4 | 1179 (5.) |
| Conflict resolution | 1 | 14 | 13 | 4, 7 | 7 | 5 | 10 | 5 | 1353 (7.) |
| Entrepreneurial competence | 1 | 14 | 13 | 9 | 8 | 4 | 11 | 7 | 1412 (8.) |

*Table 2:* Statistics of ranks
Source: on the basis of own calculation

The Kendal Concordance Index, which measures the degree of similarity, assesses the agreement in rankings between 0 and 1 (where 1 indicates complete opinion identity and 0 indicates no opinion agreement), is used to characterize respondents' opinion

concordance. The concordance index, calculated on the basis of the rank of 183 respondents, is 0.206, which means that we can hardly speak of the same opinion.

The Minimum (Min) and Maximum (Max) values, the Range (R) that is the difference of the Minimum and Maximum, the Mode – the most common rank (Mo), and the quartile (Q1 – Q2 - Q3) values were examined as statistics describing competency rankings. Quartiles divide the distribution into four equal parts. Of the cut points, the Median (Me) value indicates the rank of the middle responder, ranked by rank. The Interquartile Range (IQT) shows the difference in the ranking of the middle 50% of the respondents. The last column of Table 2 shows the Total that is the sum of the rank numbers.

It would be easiest to make a final order of competences based on the latter (indicated in brackets behind the Total score), but in this case many further conclusions would be missed. However, we should not forget the fact that respondents' opinions are far from uniform in the order of competences, which would provide a good basis for such a final ranking.

The Kendal Concordance Index, which measures the degree of similarity, assesses the agreement in rankings between 0 and 1 (where 1 indicates complete opinion identity and 0 indicates no opinion agreement), is used to characterize respondents' opinion concordance. The concordance index, calculated on the basis of the rank of 183 respondents, is 0.206, which means that we can hardly speak of the same opinion.

If we look at the distribution of ranks by competencies, it becomes clear in case of which competencies people seem to think the same and in case of which competencies many people seem to think differently. In addition to the figures, the IQR indicators in Table 2 objectively indicate the degree of agreement / disagreement.

Thus, in case of Problem solving (Mo = 1, Me = 2), Adaptability (Mo = 3, Me = 5), Numeracy (Mo = 12, Me = 11), Comprehension (Mo = 12, Me = 10) and Cooperation (Mo = 6, Me = 6) the opinion is relatively concentrated around certain ranks.

At the same time, there are very different opinions in connection with Entrepreneurial and Technological Technical Competence. Where there is less consensus, a multi-modal distribution can be seen - see Learning.

**Conclusions**

As the result of our research it can be stated that the importance of work competences in the field of agriculture is inhomogeneous among students. However, out of the 14 factors ranked, it is clear that interpersonal competences were considered more important and personal ones less important (Table 3).

If we examine the competency assessments, applying the Wilcoxon test values we can identify those competencies, between the importance of which there is no significant difference.
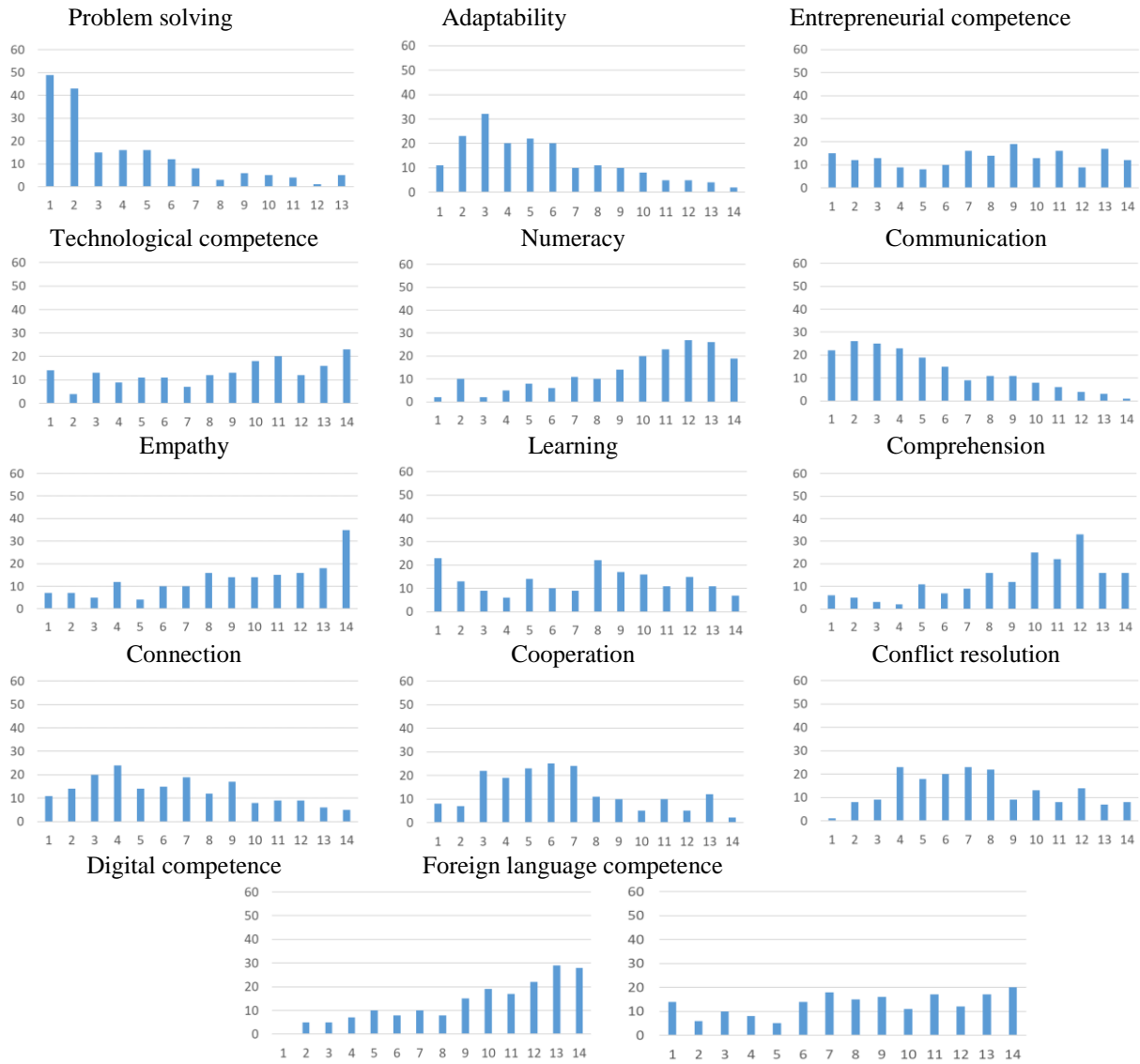
*Figure 2:* Distribution of ranks
Source: on the basis of own calculation

**Summary**

Based on the results, the following competency groups with the same rating can be distinguished:

o problem solving - adaptability - communication,
o entrepreneurial competence - learning - conflict management - foreign language competence,

o technological technical competence - empathy - foreign language competence,
o numeracy - empathy - comprehension - digital competence,
o communication - cooperation.

| Rank | Competency | Sum of ranks | Type |
|---|---|---|---|
| 1 | Problem solving | 707 | Interpersonal |
| 2 | Communication | 923 | Interpersonal |
| 3 | Adaptability | 986 | Interpersonal |
| 4 | Connection | 1172 | Interpersonal |
| 5 | Cooperation | 1179 | Interpersonal |
| 6 | Learning | 1324 | Personal |
| 7 | Conflict resolution | 1353 | Interpersonal |
| 8 | Entrepreneurial competence | 1412 | Personal |
| 9 | Foreign language competence | 1529 | Personal |
| 10 | Technological, technical competence | 1554 | Personal |
| 11 | Empathy | 1709 | Interpersonal |
| 12 | Comprehension | 1749 | Personal |
| 13 | Numeracy | 1788 | Personal |
| 14 | Digital competence | 1830 | Personal |

*Table 3:* The sum of the ranks
Source: on the basis of own calculation

**Keywords:** competences, agricultural economics, ranking

**Acknowledgement**

**Literature**

Bacsi, Zsuzsanna (2017): Sociocultural Diversity, Competitiveness, Development. In: RESEARCH JOURNAL OF ECONOMICS 2 : 3 Paper: 10.4172/rje1000e103 , 8 p. (2017)

2006/962/EK: Az Európai Parlament és a Tanács ajánlása (2006. december 18.) az egész életen át tartó tanuláshoz szükséges kulcskompetenciákról.

Borbély-Pecze T. B. - Suhajda Cs. J. (2017): Pályaorientáció és tanárképzés. In.: OPUS ET EDUCATIO: MUNKA ÉS NEVELÉS 4 : 1 pp. 62-75.

Budavári-Takács I.- Suhajda Cs. J. (2015): A munkavállalótól elvárt kompetenciák vizsgálata álláshirdetések elemzése alapján. In: Csehné Papp Imola, Budavári-Takács Ildikó, Mészáros Aranka, Iliás Anikó, Poór József (szerk.) Innováció – növekedés – fenntarthatóság, Budapesti Kereskedelmi és Iparkamara, Budapest, pp. 50-56. ISBN 978-963-89734-1-2

Csehné Papp I. (2014): Munkaerő-piaci álmok. In: Kulturális és társadalmi sokszínűség a változó gazdasági környezetben. szerk. Karlovitz J T, International Research Institute, Komarno, pp. 235-242, ISBN 978-80-89691-10-4

Kárpátiné Daróczi J. (2016): A kompetencia hatalom? Mit ér a gazdasági felsőfokú képzés, ha nem ad diplomát? Doktori értekezés, Veszprém, Pannon Egyetem, Gazdálkodás- és Szervezéstudományok Doktori Iskola.

SUHAJDA CS. J. (2017): A pályaorientációs tevékenység változása és megvalósulása a köznevelésben a rendszerváltozástól napjainkig, különös tekintettel az információs folyamatokra. Doktori értekezés, PTE.

SUHAJDA CS. J. (2018): Munka-pályatanácsadással foglalkozó szakemberek helye, szerepe a munkaerőpiacon. In.: Sok a levél, de egy a fa. Tanulmányok a pályatanácsadás témaköréből. (szerk. Dr. Suhajda Csilla Judit). Gödöllő, 2018.

Szilágyi K. – Völgyesy P. (1985): Értelmiségivé válás a mezőgazdasági felsőoktatásban. Budapest, MÉK Agroinform.

# „LOCAL RESOURCES" SECTION

# FOREIGN DIRECT INVESTMENTS (FDI) IN V4 COUNTRIES

*Orsolya PÓCSIK*

Szent István University, address: SZIE GTK RGVI, PhD hallgató, Enyedi György Regionális Tudományok Doktori Iskola
E-mail adress: Pocsik.Orsolya@phd.uni-szie.hu

## Introduction

This paper main aims to compare the V4 countries -Czech Republic, Hungary, Poland and Slovakia- on the basis of their economic features in case of FDI and to exame the connection of FDI inflow and euro euro introduction. The Visegrad Countries are the most higly developing group of countries in the EU 28. The key solutions for economic difficulties may include a more efficient business cooperation between these regions, a more efficient distribution of the disposable financial resources, the encouragement of foreign direct investment.

Two major groups can be distinguished according to the neoliberal economic policy of Eastern Europe:

-- Life support (Czech Republic, Poland, Slovakia). It means their economy is rapidly innovating, and with the help of domestic and FDI their economy is rapidly recovering. Divorce situations are rapidly recovering because of their proximity to the EU and Germany.

-- Follow the competitiveness and growth (Hungary). Our economic policies follow a whole new path that is partly similar to the Slovak and German economy and partly follows its own path.

The FDI always shows the fact of long-term shareholding, these are the main forms e.g.: new business start-ups, investing in the existing company, intra- corporate lending, starting international mobility of company-specific resources, increasing of the importance of international transactions, reduction of the transportation and the communication costs, increasing the role of access at fixed location, comprehensive liberalization of trade-, financial and capital markets. The FDI motivations for investors are the followings: increasing efficiency of the company, the extension markets and maximizing profits, ownership benefits, increase in the capital reserve, location - regional benefits, and access to international benefits. The socialist countries were out of the international capital flows. As soon as the economic environment has allowed, since the 1970s, it has been a significant reversal, number of countries have been allowed to set up joint ventures in the region.

It took place significant changes after the regime change, and the whole region was reintroduced into international capital flows. Those areas have appreciated with favorable geographical location- especially in the western border areas- there have created important capital centers.

The economic policy cycles are adapted to 4-5 year political cycles. The starting points, values and objectives of the strategy have been vary from country to country and it should be examined in the V4 region.

**Literature review**

Matolcsy had written in his article that the primary treatment of the financial crisis was to overcome past indebtedness. The solution's slogan was downsizing. Bod's study points out that the success of a country depends on joining the single currency. it may speed up or delay the introduction of the single European currency, the euro. There has no agenda in Hungary for when and under what conditions they can enter the given ERM-2 system at the HUF / EUR exchange rate. In their joint study, Gy. Neszmélyi-Lampertné Akócsi-E. Bruder (2016) compared the V4 countries, pointing out the differences between the countries and the tendency of the countries to increase in terms of convergence in relation to the EU average. According to (Szanyi, 1997) there are four FDI theories: *The first theory*, what based on Hymer was the first man who was investigated the motives of foreign investment firms. *Second Theory:* Chandler assumes that the competitive advantage of US investors, who played a prominent role in international working capital flows in the 1950s and 60s, he was derived from superior managerial knowledge *Third Theory:* of FDI is related to Robert Aliber (1970). *The Fourth Theory- todays way of FDI*, the question was how much a company would invest in foreign capital if its goal was to diversify portfolio investments or to reduce exchange rate risks. The authors, Neményi-Oblath asked how Hungary could introduce the euro and how it would affect the surrounding V4 countries. With the research of Carmen Reinhart and Kenneth Rogoff, I explain the fact that, after a global financial crisis, it takes an average of seven to eight years for a state to resolve a crisis, more or less.

**Material and methods**

The study explores the descriptive, pre-privatization and economic policy privatization phase. Accession of the four Visegrád countries to the European Union did not happen simultaneously, with foreign capital inflows. The study is mainly based on secondary information. Most of the secondary information comes from literary sources in international (mainly Hungarian and international) libraries, and the statistical data used and referenced are from international macro-level (EUROSADT) information and databases. It is worth mentioning that the author used as a starting point for his study the most relevant of his many publications on the subject.

**Reasons for FDI**

I have been looking for several reasons why foreign working capital is flowing into our country, but I have experienced the main reason and the driving force behind the privatization in the V4 region. The decisive two years - at least for Hungary - were 1988 and 1989. This was easy to read from the IMF report. This period is assigned the following characteristics: the majority role of state ownership was determining, all legal and economic restrictions have been demolitioned, free flow of capital, the goverment hadv allowed to 100% ownership, the free trades have provided relief from taxes and VAT on tangible contributions, foreign citizan can be holding leadership positions.the state had given offers and discounts for capital expenditures. Hungary pursues a specific neoliberal economic policy, which consists of: inferior effect, the market is better

allocating, the regulatory market is huge, globalization is good and beneficial to everyone.

Social views reasons include: demographic reasons, pro-cyclical Orthodox Economic Policy with five years again and again.

| (1) Euro area, the common currency is the euro | (2) Those who are still outside the euro area or who are still in the euro area, ie aspirants | (3) Outsiders |
|---|---|---|
| Austria | Hungary | Denmark |
| Belgium | Czech Republic | the United Kingdom |
| Cyprus | Croatia | |
| Estonia | Poland | |
| Finland | Romania | |
| France | Sweden | |
| Greece | Bulgaria | |
| Netherlands | | |
| Ireland | | |
| Latvia | | |
| Lithuania | | |
| Luxembourg | | |
| Malta | | |
| Germany | | |
| Italy | | |
| Portugal | | |
| Spain | | |
| Slovakia | | |
| Slovenia | | |

*Table 1: Countries of Euro Session*
Source: own edits

**Dilemmas of staying outside the euro area:**

To understand these reasons, it is necessary to look at the countries of the European Union which have already joined the single currency system (1), which have left or intend to join the euro area, are aspirants in the near or distant future (2) and which chose to be completely absent (3).

The euro area includes the EU countries that have replaced their national currencies with the common European currency, the euro. All countries are part of the Economic and Monetary Union (EMU), with 19 Member States belonging to the aforementioned euro area. Three of the 12 Central and Eastern European (former Socialist) member states of the European Union have joined the euro area: Slovakia in 2009. (Oblath-Neményi) Outside the euro area, there are aspirational countries that remain outside for some time due to economic policy reasons. (e.g: Hungary, Czech Republic, Poland). Another common feature is that the euro entered the Union after the introduction of the euro in 2002. It is worth mentioning the case of Slovakia, which joined the Union after 2002, but it has been a member of the euro area for ten years. It cause the success of Slovakia. The third largest group are outsiders who insisted on their own currencies. This includes Denmark and the United Kingdom. All in all, the current government has undoubtedly cut off its predecessors' communication on the euro area's accession, but in essence, there has been no material change: the true governmental intentions of

introducing the euro in Hungary remain unknown. However, the Hungarian economics profession does not have to accept this uncertainty created by politicians.

**Other reason of FDI- Privatization in a way of V4 Group**

There was no deadline for joining the countries of the region, but with their entry, they undertook to enter the eurozone, which so far has been completed by one of the four countries. Trade in these countries depends primarily on the location of multinational companies and the volume of capital inflows.

Another important and determining factor is the strength of my own currency and / or the changeover to the euro. I also consider it a success factor for Slovakia and the Czech Republic.

The attitude of the Czech Republic and Hungary towards the euro is similar. Although not nearly the same economic policy interests move the two countries. The Czech Republic was in no hurry to adopt the euro, nor does the government's intentions indicate this. The above reasoning also provides a (reverse) explanation of why the Czech Republic has not hastened to join the eurozone since joining the EU and why procrastination has received social support. History of the introduction of the Czech crown - their currency is clearly stable. Essentially, because the Czech Republic has always considered itself "European" - it did not need external confirmation. Macroeconomic stability had every reason to do so, as the Czech economy's internal and external balance - and thus its growth - has always been more solid than that of most euro area countries.

The case of Hungary, as we have seen, is in almost every case the opposite of that of the Czech Republic: after the accession to the EU, external references and reinforcements offered by the euro were needed, but the governments of that time (Medgyessy and Gyurcsány) abused it.

However, the current (Orban) government does not wish to use this opportunity. However, as will be explained later, in order to regain its credibility, it has a strong need for a program aimed at creating the conditions for the introduction of the euro. In other words, it is not Slovakia, but the Czech Republic, which offers us a worthy example: establishing stability is far more important than setting new target dates. (Oblath-Neményi)

Moreover, in the V4 countries, the gross savings of economic agents in the ten to fifteen years preceding the crisis were much lower than the countries' investment rates, which led to deficits in the current account. The reason is simple, investments as a share of GDP were much higher than the savings of economic agents. In other words, most of the investment came from foreign sources, with the help of quasi-foreign working capital.

The countries' public budgets, which showed a deficit, were less able to finance homeowners and businesses, borrowed more and had a high current account deficit. The financial system of the countries is in crisis, which countries have tried to solve by various economic policy measures.

| Slovakia | 1993-1997 slider devaluation; <br> 1998-2004  The key to the success of the CEE region was privatization, which provided the V4 countries with economic policy growth and a favorable global environment for the inflow and establishment of foreign working capital. As a result of the global economic crisis of 2008, the region has experienced setbacks and losses in exports and imports, and convergence has slowed down. The factors of production also changed, and the membership of the EU and the proximity of Germany were the success of the exit of the Visegrad 4 crisis. <br> Slovakia's success story continued with the introduction of the euro, which has continued to stimulate FDI flotation; <br> 2004- 2009 slider devaluation; till 2009 use of euro (permanently <br> fixed exchange rate system) |
|---|---|
| **Hungary** | 1990-1993 fixed exchange rate system; <br> 1994-2007 slider devaluation; <br> till 2008 flotational exchange rate system |
| **Czeh Republic** | 1993-1995 fixed exchange rate system; <br> 1995-1996 slider devaluation; <br> 1996-2002 directional flotation exchange rate system; <br> till 2003 flotational exchange rate system |
| **Poland** | 1990-1991 fixed exchange rate system; <br> 1991-1998 slider devaluation; <br> till 1998 flotational exchange rate system |

*Table 2:* The course of convergence process in case of Visegrad 4 Group
Source: Own edition based on IMF (2014)

Hungary, household consumption increased with the expansion of the market, while the income of the population, as well as inflation and the continuous borrowing of economic agents, worsened the foreign trade balance. The country's income gap has also worsened as foreign direct investment inflows have increased, leading to an increase in non-domestic investment income and a rise in government borrowing, resulting in external indebtedness and rising interest rates, which we paid in the form of foreign loans. As a result, the country's economic players became indebted rapidly, their financing needs increased, ie they borrowed from a loan, and all this had to be paid in foreign currency, since the borrowings were realized there. Following the privatization of multinationals, the consumption of economic operators increased our imports, which led to a deterioration of the goods balance. The income of the state deteriorated with the debts of the state actor presented through the above example and the mandatory payment of interest. Apart from these reasons, the general government deficit was further exacerbated by the payment of foreign capital gains in Hungary. The inflow of foreign working capital became necessary because it financed the current account deficit. Cross-border indebtedness has made our economy vulnerable and open.
Hungary has gone through a period of economic change.  The economy, which had to be rebuilt, was almost nullified, mainly by means of knowledge allocation, capital and technology transfer. In Hungary, the foreign-owned regulatory economy model can be fully interpreted. Equity and counterweight, which runs the economy, but at least as

important, is the presence of foreign capital. Businesses, political parties are indispensable participants in the economic processes. - It can be said that the distribution of capital is disintegrated in all countries. The government does not upset macroeconomic equilibrium, but seeks to comply with macroprodential elements. Real power belongs to those national organizations, parties, foreign-owned state-owned enterprises. There are no real economic policy trends in Central and Eastern Europe, at least no Eastern European trend, it has, no recipe. Foreign companies have to adjust to German capital requirements, as Slovakia and Hungary are governed by German capital investment and placement, which can be interpreted as an industrial BOOM in these countries. It is worth mentioning a few lines about greenfield investments in these countries and the reasons and consequences of economic policy.

The Hungarian government announced the new economic policy, which was based on two pillars: the balance and the growth, and it has been the third pillar, what means the raising the employment rate and lowering the unemployment rate.

The aim was to restore the financial balance in the short term. Long-term sustainable financial equilibrium was conceived by expanding employment, restarting growth and implementing the structural reforms needed for equilibrium…. However, the crisis management strategy proved to be flawed, behind the failure of economic convergence between 1990 and 2010 under the first pillar: "balance and growth". Budget revenues should be supported by a new tax division.

At the same time, in order to encourage job creation, employment, investment and the accumulation of knowledge capital, taxes on income should be reduced, while taxes on income and turnover should be substituted for income taxes. Therefore, a comprehensive tax reform had to be introduced. (Matolcsy, 2015)

Also part of the crisis management strategy announced in mid-2010 was to immediately address past indebtedness processes, first to stop and then write off previously accumulated debt. Part of the strategy halt household debt in foreign currency and then write off previously accumulated debts, which required some debt financing. There was also a need to cut down on foreign currency loans to households, high debt service burdens constrained family consumption, and a further decline in household consumption, amounting to around 60% of GDP, made it impossible to raise employment rates and reduce unemployment. (Matolcsy, 2015)

*Integration strategies between V4 countries:* The establishment of a two-tier banking system were an important time in the economy. Impact of Hungarian policy, with special regard to Poland and the Czech Republic. For countries, these are major economic policy issues that go beyond a single economic policy cycle. The economic policy of a country must be thought of abstractly, especially in the case of a region. In many cases, the question is where those points are, whether national economies are afraid of imbalances or whether monetary policy controls and counterpoints are needed. Finding political engagement and proportion is important in my interpretation. Continuous equilibrium does not exist and may not exist, but neoclassical directions in economics must be taken into account. One of the most important results of recent years is that the Visegrád states are also at the forefront of employment processes: the stability, profitability, comapnies' operational and tax environment, growth opportunities of companies, (such as credit trends, household debt service)

technological efficiency of campanies (such as using online banking, number of employees in proportion to premium interest deposits, asset-level cost level). The impact on FDI is strongly influenced by the ability of a given country's economy to absorb it.

In the Visegrád countries, as a result of economic growth, regional economic development disparities have increased significantly, but this process stops after reaching a certain level of development and seems to be reversing. The growth path of the V4 country group has been much steeper, while the more developed regions have followed a more balanced path over the last 15 years (Neszmély-Lampertné Akócs-Bruder, 2014)

*I have already written about the theory of capital movements: The first theory*, based on Hymer, he was the first to investigate the motives of foreign investment firms. According to this, the company is not characterized as a production function at the center of neoclassical investigation, but as an enterprise with different values.

Some of these are embodied in objects, others are not related to objects (knowledge, experience, knowledge). (Szanyi, 1997) In the 1960s, corporate governance was no longer characterized by production, capacity, productivity, but tangible and intangible assets. *Second Theory***:** Chandler assumes that the competitive advantage of US investors, who played a prominent role in international FDI in the 1950s and 60s, he was derived from superior managerial knowledge (Szanyi, 1997).

*Third Theory***:** The third theory of foreign working capital is related to Robert Aliber (1970). In his theory, he discovered the characteristics and options of international capital and currency markets in the background of capital flows. The internationalization of currency convertibility opened up opportunities for a large number of international financial operations in the 1950s and 60s. By creating and buying foreign power for production, the capitalists of the investing country want to exploit the investor's currency. (Szanyi, 1997) There was a way and an opportunity for the free movement of FDI. *The Fourth Theory***:** also financially oriented, the question was how much a company would invest in foreign capital if its goal was to diversify portfolio investments or to reduce exchange rate risks. Thus, this international portfolio results in an investment theory. (Szanyi, 1997) In the remainder of the study, beyond the theory of capital, I deal with corporate governance and strategic allies, and the arrival of working capital in Hungary and in V4 counries. Knowledge of all these is important to understand the FDI from abroad.

It is worth considering the direct working capital investments of the last 10 years in the V4 countries of the region. Numerous studies deal with the 2008 global economic crisis and its effects, the results of which will be visible in the period 2008-2010. Slovakia and Hungary have performed very poorly in recent years in terms of foreign direct investment. During the years of economic crisis, Slovakia's territorial disparities are not comparable to those of the other V4 countries, as during the period 2008-2012, Slovakia is the only V4 country within which territorial disparities have continued to increase. The annual growth rate of Slovakia's territorial disparities was well above the average for the V4 and the EU countries under review during the crisis. According to the most recent data, territorial differences in all four Visegrád countries started to decrease. This phenomenon was also true for the European countries examined, but the rate of

convergence of the Czech Republic, Hungary and Poland was above the EU average.(Neszmélyi Gy. I. – Lampertné Akócsi I. – Bruder E., 2016)

Studies by Carmen Reinhart and Kenneth Rogoff show that, after a comprehensive financial crisis, it takes on average seven to eight years for economies to resolve and survive the crisis (Reinhart and Rogoff, 2009).

The eight-year is an average. Crises different, as it does the responses of the economies concerned to the crisis. Eight years after 2007, the level of activity in the US economy was well above pre-crisis levels.

The European average were also very difficult to reach at that time, with huge differences. To get closer: Poland or Slovakia's economy has advanced much more in eight years, according to Gross National Product (GDP), 20-30% higher than before the outbreak. However, Hungary really needed the average period of literature to reach pre-crisis levels of income and employment.

And ten years in retail consumption and investment is not enough to catch up with the past. In addition, the 1990s were marked by radical changes, including the blessing and failure of privatization. (Bod, 2018)

In Europe, only two countries (Poland and Albania) did not suffer a downturn in 2009. The others all went through a crisis. evenings. Hungary has suffered a decline of more than six percent. Who is to blame for the global financial crisis? In order to understand these processes, we must recognize that both the failures of state regulators and the accumulation of errors by market participants, especially financial institutions, can be inferred. (Bod, 2018)

| Country | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Czeh Republic | 113.2 | 125.8 | 128.5 | 120.6 | 136,5 | 134.1 | 121.5 | 116.6 | 121,9 | 156,0 | 155,0 |
| Poland | 148.4 | 167.4 | 187.6 | 164.4 | 199,0 | 232,0 | 211.5 | 186,0 | 188.7 | 238,5 | 231,8 |
| Hungary | 88. 1 | 98.9 | 90.8 | 85.3 | 104.0 | 108,6 | 99,6 | 84,9 | 80.7 | 90,6 | 88,8 |
| Slovakia | 50.4 | 52.5 | 50.3 | 52,0 | 55.1 | 58,0 | 49.7 | 46.0 | 47,6 | 55,9 | 57,1 |
| European Union 28 | 6.275,5 | 6.849,8 | 6.850,5 | 7.060,4 | 7.858,6 | 8.222,5 | 8.596,9 | 8.682,0 | 8.629,1 | 10.168,6 | 10.113,8 |

*Table 3*. Foreign Direct Investment (2008 -2018) [USD thousand million], Eurostadt, 2018
(1) Czeh Republic, (2) Poland (3) Hungary (4) Slovakia (5) European Union 28

In the figure above, I have seen direct working capital investments in the 2008 and 2018 intervals. The table illustrates the group of 4 in Visegrád compared to the 28 in European Union. The data were obtained from the tables of Eurostadt, which in itself can be interpreted as linearism. In the Czech Republic, after the crisis of 2007-2008, more foreign capital came in between 2014 and 2017 and from 2017 on wards, foreign direct working capital increased again. In the case of Poland, foreign working capital in 2008 and 2018 has almost doubled in terms of foreign investor success as a kind of economic miracle. Hungary has been moving along a rising or falling curve with similar starting and ending points. Investment sentiment in the EU-28 countries is growing intensively and is almost certainly optimistic.

Most of the FDI from the Regional Countries came to Poland. While Slovakia has the smallest population (5.45 million). The population of Hungary and the Czech Republic are almost identical, but the secret of the success lies in the existing industrial settlements, regions, stable economic environment and infrastructure.

| Country | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Czeh Republic | 609,7 | 276,7 | 580,4 | 219, 1 | 754,6 | 344,0 | 519,1 | 44,0 | 927,7 | 700,6 | 14 556,2 |
| Poland | 319,6 | 261,2 | 333,0 | 414,4 | 323,3 | 71,1 | 371,3 | 397,4 | 362,4 | 167,4 | 6 104,5 |
| Hungary | 629,8 | 198,9 | 219,0 | 630,9 | 1450,8 | 343,3 | 790,4 | -1496,7 | 595,6 | 245,4 | 9 082,5 |
| Slovakia | 905, 5 | -1,1 | 328,4 | 647,4 | 540,3 | -111,6 | -94,5 | 19,6 | 54,4 | 418,9 | 10 478,7 |
| European Union 28 | 596,2 | 763,4 | 707,8 | 848,5 | 960,2 | 672,7 | 507,3 | 1 006,8 | 1 022,7 | 592,5 | 19738,0 |

*Table 4*. Foreign Direct Investment per capita (2008 -2018) [USD million]
(1) Czeh Republic, (2) Poland (3) Hungary (4) Slovakia (5) European Union 28

Source: Own calculation based on EUROSTADT, 2019

The method is very simple; I divided the foreign working capital by the population, so I got the above results. The results are expressed in USD million.

## Conclusions

Without government, you can produce, export, enter into business transactions, but the state of public finances can speed up or delay the adoption of the common European currency, the euro. There were countries where political forces have subordinated their secondary interests to the bigger cause: their rapid and successful integration into European structures. the member country is admitted to the eurozone. There were no serious question in Hungary as to when and at what forint / euro exchange rate we would enter this particular ERM-2 system. The entry condition is still the independence of the national bank of the candidate country from the government. ( Bod, 2017)

The key to the success of the CEE region was privatization, which provided the V4 countries with economic policy growth and a favorable global environment for the inflow and establishment of foreign working capital.

As a result of the global economic crisis of 2008, the region has experienced setbacks and losses in exports and imports, and convergence has slowed down. The factors of production also changed, and the membership of the EU and the proximity of Germany were the success of the exit of the Visegrad 4 crisis. Slovakia's success story continued with the introduction of the euro, which has continued to stimulate FDI.

Since Poland whas been not affected by the crisis, its economic policy was on its way, and there are numerous places in the daily press that talk about the Polish miracle. Poland also has a specific target date for the introduction of the euro.

The Czech economy is stable, but its economy has been hit by the crisis. To thank to the high FDI inflow, the economy has strengthened, though for some strange reason they are clinging to their own currency.

**Summary**

There are no doubt that the focus of catching-up disputes is export and import volumes and the associated inflow of foreign direct capital. The Czech example also shows that their catching-up policy has been partially successful and that they would have more leeway if they switched to the euro. Poland is on the rise, but much closer to catching up with Europe as they have a specific target date.

If the euro were introduced in Hungary, more foreign capital would flow into that country, and our economy would become stronger on the Slovak model and become more competitive across Europe This could be the way and the way to more European economic growth, and it is an unique Hungarian way, which can only be interpreted as a combination of foreign direct capital inflows and the introduction of the euro. The two economic processes are mutually reinforcing and, in my opinion, will result in clear growth for Hungary.

**Keywords:** FDI, V4 countries, post-socialist countries, GDP

**Literature:**

BOD, P. Á.: Nem szokványos gazdaságpolitikák, Akadémiai Kiadó Zrt., 2014, ISBN: 9789630594974

BOD P. Á.: A közös európai valuta értékállósága és a szabályalapú nemzeti költségvetések mai kérdései. In: LENTNER, Cs. (szerk.): Pénzügypolitikai stratégiák a XXI. század elején. Akadémiai Kiadó, Budapest, 2007, 125–137

BOD, P.Á.: Magyar gazdaságpolitika – tűzközelből, Budapest, Akadémiai Kiadó, 2018 ISBN 978 963 05 9893 4

MATOLCSY, Gy.: Egyensúly és növekedés - Konszolidáció és stabilizáció Magyarországon 2010-2014, Kairosz Kiadó, 2015 ISBN:978-963-662-734-8

NEMÉNYI, J.- OBLATH, G.- Az euró bevezetésének újragondolása, Közgazdasági Szemle, LIX. évf., 2012. június 569684 o.

NESZMÉLYI, Gy. I. – LAMPERTNÉ AKÓCSI, I. – BRUDER, E.: A Williamson-hipotézis teljesülésének vizsgálata az Európai Unióban és a Visegrádi országokban, Gazdaság és Társadalom, 2016/4 83-100 p.

SZANYI, M.: Elmélet és gyakorlat a nemzetközi működő tőke- áramlás vizsgálatában. Közgazdasági Szemle, XLIV. évf., 1997. június (488-508. o.)

REINHART, C.M- ROGOFF, K.S. (2009): This Time is Different: Eight Centuries of Financial Folly. Princeton, Princeton University Press


Online resurces:
 BODP. Á.:http://www.magyarszemle.hu/cikk/20050101_nem_vagyunk_europa_streberjei2017. november 12. 17:10
 Eurosadt tables

# FRESH WATER, AS A „CULTURAL SERVICE" IN SOFT TOURISM OF HÉVÍZ

*Angela SZANATI* [1] *– Zsuzsanna BACSI* [2]

[1] University of Pannonia, Georgikon Faculty, Department of Economics, Social Sciences and Rural Development, Deák F. u. 16, H-8360, Keszthely, Hungary, angieszan@gmail.com
[2] bacsi-zs@georgikon.hu

## Introduction

Hévíz is one of the most attractive destinations for domestic and international tourists in Hungary. Hévíz was the second most popular destination of foreign tourists after Budapest based on the number of foreign guest nights, and the fourth most visited town by domestic tourists in 2017. Lake Hévíz is a unique natural phenomenon, because it is the second biggest thermal lake in the world, which is biologically active and suitable for swimming. Ecosystem services are the benefits provided directly and indirectly to people by biodiversity and ecosystems. Fresh water is a „provisioning service" in the Millenium Assessment. The human uses of fresh water include, for example, domestic use and transportation. Just the same, fresh water and the hydrological cycle sustain rivers and lakes too, as inland water ecosystems. These ecosystems provide several other services: cultural, regulating and supporting services.

## Literature review

Hévíz is a spa town in Zala County in Hungary (Figure 1). This spa town has the long-term strategic objective to become one of the ten best spas of Europe by 2030, providing high-level, high quality and exclusive services. The future of Hévíz is determined by Europe's largest natural thermal lake of unique features, and health tourism. The town's goal is to make Lake Hévíz acknowledged as a World Heritage Site. This would be a major event and an outstanding achievement for the town. The infrastructure and services are based on the spa lake and its features, which may change with future developments and modifications. In the next years, there is need strengthen the tourist offer of the town and widen the scope of the offer in order to make Hévíz internationally competitive.

*Ecosystem services*
Ecosystem services contribute directly and indirectly to human well-being (Figure 2).
**'Provisioning Services'** include water for drinking, domestic use and agricultural use (consumptive use); water for generating power and transport (nonconsumptive use); aquatic organisms for food and medicines. The importance of water to food production is significant. Water is very important for fish production. Hungary plays an important role in Europe's fish production. In the natural waters the recreational fisheries have gained ground recently in comparison to the commercial fisheries (INTERNET1).
**'Supporting Services'** mean the role of water in nutrient cycling (in the maintenance of floodplain fertility and in primary production. Marine organisms produce an estimated 80% of the world's oxygen (Witman, 2017). Plankton photosynthesis is a fundamental process at the global and ecosystem scale, because it is responsible for about half of the primary production in the biosphere (Field et al., 1998).
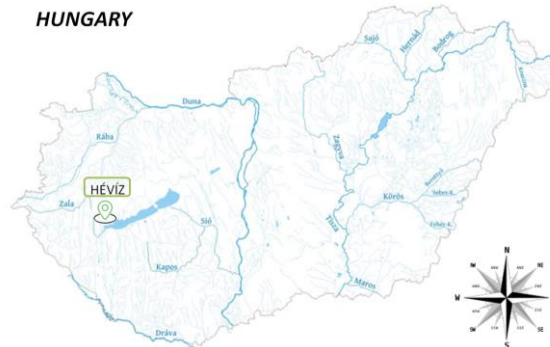
*Figure 1*. Lake Hévíz is located in Hungary
(1) **author's own construction**

One of the best examples of **'Regulatory Services'** is maintenance of water quality (natural filtration and water treatment). Also, buffering of flood flows, erosion control through water/ land interactions and flood control infrastructure are part of it, too. Water ecosystems and human development are inseparable. Without water, development does not exist. Moreover, other ecosystems and people can suffer without water. The use of water is inseparable from the proper functioning of aquatic ecosystems and the ecosystem services they provide (Hanley-Barbier, 2009).
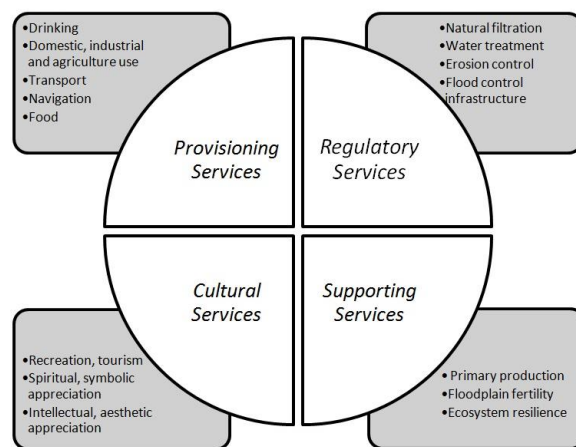


*Figure 2*. Ecosystem Services by Freshwater
(1) **Author's own construction based on Chopra et al., 2005.**

New York City's water supply system is one of the most extructive municipal systems in the world. NY City has got well protected wilderness watersheds, so its water treatment process is simpler than in other cities in the USA. The city has tried to restrict development throughout its watershed. The result of the reconstruction of the catchment

area's ecosystems is the high-quality water which is used in the city. This method purifies the city's water naturally. The water supply system has become environmentally friendly and cheaper than a drinking water treatment plant. Widely used natural water treatment is riverbank filtration (RBF). RBF offers numerous advantages concerning improvement of water quality (Ray et al., 2002). Riverbank filtration is a kind of ecosystem service which is used in many watersheds in the world, for example in USA, Germany, China and India (Davidesz, 2009). Along the Danube River, RBF has been used for the water supply in Budapest over 150 years in Hungary. At the Szentendre Island, water does not need post-treatment except disinfection, which is required after riverbank filtration processes (László, 2003).

*'Cultural Ecosystem Services'* are the non-material benefits that people obtain from ecosystems. These include recreation, tourism, intellectual development, spiritual enrichment, reflection and creative and aesthetic experiences. Freshwater systems provide several such ecosystem services.

The best known cultural services are recreation and tourism. Healthy, clean and biologically diverse freshwater ecosystems attract many different user groups. Often in national parks or other protected areas, tourists and sightseers can enjoy bankside paths, trails and viewpoints. These people are drawn by a landscape's aesthetic appeal or iconic species.

Freshwater ecosystems possess intellectual and aesthetic value. Many early settlements were built near freshwaters, so these are often important sites for archeological studies. Freshwaters provide important outdoor field practice for students, scientists and the wider public to engage with nature. The aesthetic, ecological and historical characteristics of freshwaters are frequently important to the construction of the general character of a landscape. This 'sense of place' often affects the values, opinions and ambitions that people ascribe to a landscape, and the ways it is represented to the world, and how it is managed.

Freshwater ecosystems provide spiritual and symbolic appreciation, too. Water is playing a central role in many religious and spiritual practices. In several religions and spiritual belief systems, freshwaters are important sacred sites. Freshwaters form the way that people live, work, create and have a rest. Freshwaters can shape local and regional identities, because waters have an important influence on cultural diversity, artistic and literary forms and practices, architecture, folk stories. When they are combined, these factors may help highlight the preservation of the heritage value of cultural freshwater landscapes (INTERNET2).

The majority of the natural waters in Hungary are used both for recreational fishing and for commercial fishing at the same time. Recreational fishing is fishing for pleasure or for a fishing contest. Recreational fishing is a leisure activity (Figure 3). Commercial fishing is usually fishing for profit. Recreational fishing has significantly increased compared to commercial fishing in the three main natural waters in Hungary.

Health tourism can be classified as is shown in Figure 4. The most known water-based health tourism services are wellness, active fitness, selfness and medical wellness, and these are present in Hévíz. Thermal water as a natural healing resource is used by most forms of health tourism. It is combined with relaxation and healthy food to create a

complex healing experience. Most forms of recreational tourism may be perfectly in line with soft tourism (Bacsi, Kovács, 2016), though some forms of health tourism show the typical features of mass tourism.
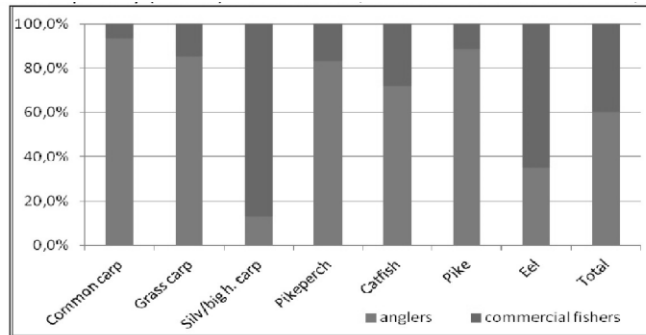


Source: Research Institute for Fisheries, Aquaculture and Irrigation

*Figure 3*. The distribution of fish caught by anglers in the Danube, the Tisza and Lake Balaton, 2010 tonnes)
(1) Source: INTERNET3
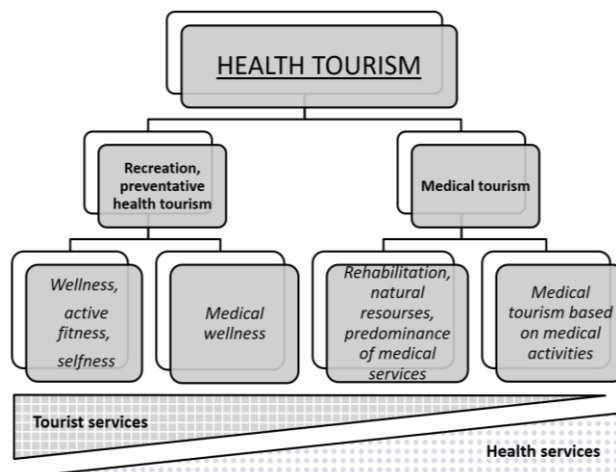


*Figure 4*. The structure of health tourism, including recreation, an important component of soft tourism
(1) Source: Author's own construction based on Kincses (2009) p.8.

**Material and methods**

Our research is based on secondary sources, scientific papers available online and offline (in libraries), including journals, studies, conference publications. We visited the websites of the municipality of Hévíz, of the Medical Spa, and of universities, and research institutions, and analysed information from the St. Andrew Hospital in Hévíz, the most relevant documents of the town of Hévíz: the environmental protection program, the urban development strategy from 2014-2020, and the integrated urban

development strategy from 2017 to 2023. We also analyzed the scientific literature about the ecosystem services provided by water, in order to properly assess the importance of this valuable resource in Hévíz. The focus of our research was the role of tourism and recreation as water ecosystem services in Hévíz.

### Results

Water is the main resource in the tourism of Hévíz. In its integrated urban development strategy, the town plans to widen the scope of its tourism appeal, by creating meditation places, yoga and resting places, and paths in the forest near Lake Hévíz. These developments would be established in the natural surroundings of the town. However, people will endanger the nature reserve, if many tourists arrive to visit these new attractions. The city wants to alleviate the problem of littering by placing waste bins in the protected swamp area, which is not a reassuring solution from the viewpoint of the environment. The planned status of World Heritage Site, with the required high-level services, and the developments of the international medical and health tourism center point towards the direction of mass tourism rather than soft tourism. The designers planned a public park in the Lake Hévíz Nature Reserve Area, which may endanger the quality of the natural surroundings, and the aesthetic character of water.

### Conclusions

Hévíz is a special town, because its main tourist attraction is the thermal lake. Most of the tourists come to enjoy the hot thermal water. The number of domestic and international tourists would probably increase considerably if Hévíz became a World Heritage Site. This would further strengthen the mass tourism character of the destination, in spite of the town's current ideas to move towards soft tourism. Urban development strategy is therefore a difficult and controversial issue, because there are contradicting objectives in the background documents of the town plans.

Natural world heritage sites positively influence international tourist arrivals and international tourism receipts globally (Bacsi, Tóth, 2019). If Hévíz became a natural world heritage site it would make more effort to incur higher spending, and perhaps this will lead to less supply of cheap accommodation available, which may reduce the opportunities for soft tourism around the lake.

**Keywords:** ecosystem services, spa, world heritage site

### Acknowledgement:

### Literature

BACSI ZS.; KOVÁCS E. (2016). Managing Health Tourism Destinations: Theory and Empirical Research in Hungary. Scholar's Press OmniScriptum Saarbrücken.

BACSI, ZS.; TÓTH, É. (2019). Word Heritage Sites as soft tourism destinations – their impacts on international arrivals and tourism receipts. Bulletin of Geography. Socio-economic Series. 45. 25-44. 10.2478/bog-2019-0022.

DAVIDESZ, J.; DEBRECZENY, L. (2009). Long-Term Sustainability of RBF Systems from Aspects of Availability and Capacity. In Proceedings of the MAVÍZ Conference, Sopron, Hungary, 11–12 June 2009. (In Hungarian)

FIELD, C. B., BEHRENFELD, M. J., RANDERSON, J. T., AND FALWOSKI, P. G. (1998). Primary production of the biosphere: integrating terrestrial and oceanic components. Science 281, 237–240. doi: 10.1126/science.281.5374.237

HANLEY, N., BARBIER, E. B. (2009): Pricing Nature: Cost-Benefit Analysis and Environmental Policy. Cheltenham: Edward Elgar Publishing

KINCSES GY. (2009): Az egészségturizmus magyarországi perspektívái – egy megújított stratégia ágazati szempontjai. ESKI, Budapest

LÁSZLÓ, F. (2003): The Hungarian experience with riverbank filtration. In Riverbank Filtration: The Future Is NOW! Proceedings of the 2nd International Riverbank Filtration Conference, Cincinnati, OH, USA, 16–19 September 2003; Melin, G., Ed.; National Water Research Institute: Fountain Valley, CA, USA, 2003.

RAY, C.; MELIN, G.; LINSKY, R.B. (2002) (Eds.) Riverbank Filtration: Improving Source Water Quality; Kluwer Academic Publishers: Dordrecht, The Netherlands

WITMAN, S. (2017), World's biggest oxygen producers living in swirling ocean waters, Eos, 98, https://doi.org/10.1029/2017EO081067. Published on 13 September 2017.

CHOPRA, K., LEEMANS, R., KUMAR, P., & SIMONS, H. (2005). Ecosystems and human well-being : policy responses. (The millennium ecosystem assessment series; No. vol. 3). Washington DC: Island Press.


INTERNET1: https://halaszat.kormany.hu/en
INTERNET2: http://fis.freshwatertools.eu/index.php/infolib/ecoservices/cultural-ess.html
INTERNET3: https://halaszat.kormany.hu/download/c/df/40000/hungarian%20fisheries_online.pdf

# NATIONAL VALUES IN BEKES COUNTY

*Ferenc ARANY* [1]

[1] Szent Istvan University, Enyedi György Regional Sciences Doctoral School, Gödöllő, Páter Károly street 1., aranyferenc10@gmail.com

## Introduction

In my research I studied the acquaintance of the Békés County Depository, for which I made an online questionnaire, which was filled by 223 people, regardless of age and gender. The questionnaire was completed anonymously, and I wondered how people are aware of the national values around them, which they might encounter on a daily basis.

## Literature review

In order to be able to understand the meaning of national value, we first need to clarify what this commonly used term really means. Currency as an object value is easy to define and does not cause a problem when it comes to defining its meaning, but defining "values" is much more complex. When we look at this concept, we see that it means something different by age, by culture and by person (but also by the same person at different stages of his life and life). According to Káposzta (2007), due to the new territorial policies, local, endogenous resources are also playing a decisive role in Hungary as the foundation stones of subsidiary construction, which can be activated under basic conditions. According to endogenous theories, improvements can be successful if, while allowing for connection to regional and global networks (Lowe, Murdoch, Ward 1995), they provide space for local involvement and local initiatives (Cernea 1992), They are based on their (natural, economic, human, cultural) resources (Kulcsár 2006; Ploeg, Dijk1995, Egri et al. 2009).

Meanwhile, through self-development, they are breaking away from external aid dependency in the long run and serving sustainable development (Murdoch1995). According to Terluin and Post (2001) and Farkas (2002), besides local resources, the importance of local activities and local actors, as well as the integrated approach, are crucial. According to Kis and Szekeresné (2010), the activities involving local organizations have an important role in this. According to Moseley (2003), preferring local resources over preferring imported raw materials and capital creates a safer and sustainable future for economic development. This requires knowledge of local resources and new business opportunities, as well as appropriate expertise. The use of local resources ensures that the invested capital remains in place and reused. In addition, emphasizing and promoting local diversity, promoting the characteristics of the place, developing and selling local identity and the associated quality goods and services also protect against globalization.

## Material and method

In my research, I have mainly examined the attitudes towards national values, which aspects of the population consider important when purchasing products and services of national value. In the course of the survey, I also explored several other phenomena, such as the socio-economic status, the place of residence, and the knowledge of the

national and county depositories. To do this, I collected data from a primary source using an online (Google) questionnaire, which was completed by a total of 223. Respondents were able to measure attitudes towards local products and market research, as well as responders to the questions using a Likert scale. Answers can range from 1 to 4 ranges (not at all important, less important, relatively important, very important), in order for the respondent to delimit in one direction rather than a comfortable neutral response. So the main question was: "How important or important to you when purchasing a product / service of national value?" I wondered how important it is to the fillers when it comes to a product of national value or buying a service.

Q161 - Product quality
Q162 - Price of products
Q163 - Freshness of products
Q164 - Support for local producers and thus for the local economy
Q165 - Hungarian origin of the products
Q166 - It is possible to buy specials
Q167 - Seller / Producer personally provides product information
Q168 - The shop has its own website / Facebook page
Q169 - There is a dining / tasting facility
Q170 - Environment is cultured, clean
Q171 - Credit card payment is available
Q172 - Person of producer
Q173 - Shopping experience and mood
Q174 - That the producer knows your purchasing habits
Q175 - Products do not contain additives
Q176 - Packaging of the product
Q177 - Brand name
Q178 - Marketing your product / service
Q179 - Taste for food
Q180 - Product / Service Recommended by Public Actor
Q181 - Opinion of others

I performed multivariate analysis, factor analysis and cluster analysis with IBM SPSS software. For the study I used R-type factor analysis suitable for information compression (Sajtos-Mitev 2007, Egri-Kőszegi 2018). The method provides an opportunity to weight individual variables and to determine their importance (Lukovics-Kovács 2011). From the cluster analysis methods I chose the hierarchical solution and from the merging methods I used the Ward method. The method is based on variance homogeneity so that homogeneous clusters can be assumed.
In addition, I will provide answers to a number of material requests, such as items in the Békés County Depository.

**Results**

*Factor Analysis*
Fillers came from several counties: the majority are residents of Békés County (with 55.6% distribution) and neighboring counties.
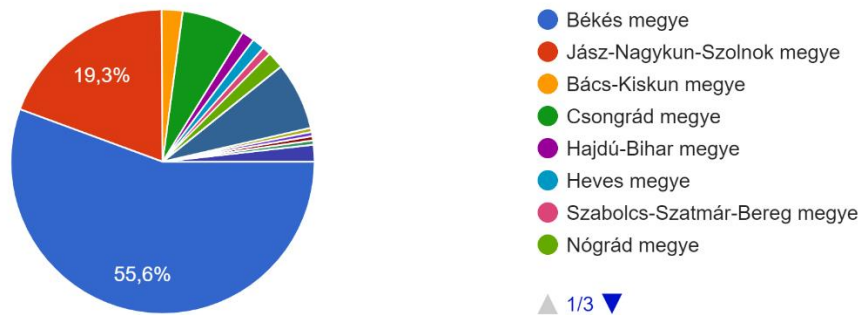


*Figure 1* - Territorial distribution of the respondents
Source: Own editing

In my research I examined national values, how well the population is aware of the values in their own environment. With the data I received, I performed a factor analysis, for which the statements - which the evaluators evaluated, according to their importance to them - were coded.

**KMO and Bartlett's Test**

| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. | | ,904 |
|---|---|---|
| Bartlett's Test of Sphericity | Approx. Chi-Square | 2421,310 |
| | df | 210 |
| | Sig. | ,000 |

*Figure 2* - KMO and Bartlett test
Source: Own editing

In Figure 2, the Bartlett test examines whether variables in the population are uncorrelated (null hypothesis), that is, tests whether the elements of the correlation matrix outside the main diagonal differ from zero by chance. We would like to reject Ho, since the condition of factor analysis is that the variables should correlate as much as possible. In the present case, the null hypothesis of the Bartlett test (no correlation between the initial variables) can be rejected, since the significance level is less than 0.05, ie the variables are suitable for factor analysis.

The Kaiser-Meyer-Olkin (KMO) criterion is one of the most important metrics in evaluating the suitability of variables for factor analysis. The "goodness" of the KMO indicator can be assessed as follows:
• KMO ≥ 0.9 excellent
• KMO ≥ 0.8 very good
• KMO ≥ 0.7 appropriate
• KMO ≥ 0.6 moderate
• KMO ≥ 0.5 poor
• KMO <0.5 unacceptable. (Kassai, 2009)

The value of the KMO is 0.904, which means that we can find excellent suitability for the national values in the examined areas.

**Total Variance Explained**

| Component | Initial Eigenvalues | | | Extraction Sums of Squared Loadings | | | Rotation Sums of Squared Loadings | | |
|---|---|---|---|---|---|---|---|---|---|
| | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % |
| 1 | 8,202 | 39,059 | 39,059 | 8,202 | 39,059 | 39,059 | 4,567 | 21,746 | 21,746 |
| 2 | 2,317 | 11,034 | 50,093 | 2,317 | 11,034 | 50,093 | 3,232 | 15,389 | 37,134 |
| 3 | 1,361 | 6,483 | 56,576 | 1,361 | 6,483 | 56,576 | 2,720 | 12,950 | 50,085 |
| 4 | 1,180 | 5,619 | 62,195 | 1,180 | 5,619 | 62,195 | 2,023 | 9,632 | 59,717 |
| 5 | 1,010 | 4,808 | 67,003 | 1,010 | 4,808 | 67,003 | 1,530 | 7,287 | 67,003 |

*Figure 3* - Total Variance explained
Source: Own editing

The "Total Variance Explained" table helps you determine the number of factors. On the one hand, the eigenvalues of the factors inform this, their values must be higher than 1. If you see a lower eigenvalue, then it contains less information in the factor itself than a variable. The number of factors can also be determined based on the cumulative percentage of variance, that is, the number of factors is created to reach a minimum cumulative level of variance for which there are many thumb rules. In science, the accepted variance ratio is at least 95 percent, while in social science research 60 percent is acceptable. The factor-explained variance is provided by SPSS by default. The table can be divided into three triplets, the first containing the Initial Eigenvalues, the second the Extraction Sums of Squared Loadings, and the third the Rotation Sums of Squared Loadings. The "Total" column shows the eigenvalue, the "% of Variance" column shows the variance fraction explained by a given factor within the total variance, while the "Cumulative%" column shows the cumulative variance fraction to a given factor. (Kassai 2009)

The "Initial Eigenvalues" columns represent the information content of the factors in a standardized form, that is, as many rows (components) as there were initial variables, and the sum of eigenvalues equals the number of components. The "initial" and "after factor analysis" columns in the table are almost identical, but the latter only contains the eigenvalues greater than 1 that we requested. The analysis shows the factors in the order of magnitude of the explained variance. (Kassai 2009) First, the factor with the highest eigenvalue / explained variance appears (4.57 / 21.75%), followed by the second: 3.23 / 15.39%. (The eigenvalue and the variance are directly proportional to each other.)

Factor 5 retains a total of 67.00% of information, which is above the minimum target of 60%.

*Cluster Analysis*

The results of the cluster analysis are presented in the Report table (Figure 4). The first cluster consists of 62, the second 30, the third 31, the fourth 4, the fifth 51, the sixth 35, and the seventh element 10. The clusters are considered homogeneous, and their internal dispersion for a factor does not meet the statistical criteria. (In the fourth cluster, the Extras factor.) In a one-way analysis of variance, each factor is significantly different for each group. The most significant differentiation can be observed along with product quality, followed by price sensitivity, producer factor, presence of extras and finally marketing aspects.

The first cluster is determined in particular by the factor of marketing characteristics, but also by the factor of producers, extras and price sensitivity, these factors are more important than the average when choosing the local product. It is interesting because the characteristics of the product quality (taste, origin, quality, no additives) are below average. This cluster is called "Market Aspects".

The second group is basically determined by marketing aspects and extras. The former is deeply below average - meaning not important - while credit card payment, website / Facebook page availability and tasting / dining are important. The importance of product quality is slightly above average, while price sensitivity is also an important factor. The producer factor is below average and the attitude of the producer is not decisive when buying local products. The cluster is named "Adventure Package".

In the case of the third customer cluster, the existence of extra features does not particularly determine customer behavior, but rather the producer and product quality. Attitudes related to marketing tools and price sensitivity are average, hence the name "Quality Consumers".

The fourth cluster has a small number of elements (4 persons) and they represent a prominent group. Significant difference can be seen in the examined sample with respect to two factors. Marketing of local products does not matter at all, but the emphasis is on the producer's attitude in selling and informing. In addition, for consumers, prices are also a determining factor when making a purchase. Product quality and the presence of extras are scattered around the average for the group. The cluster is called the "Human Factor".

For the fifth customer, low price sensitivity is one of the most important factors and the quality of the product is decisive. The other factors are average, the availability of extras slightly above the calculated average. The cluster was named "Price insensitive".

In the sixth group, the producer factor plays a very small role and price sensitivity has a significant influence on customer decisions. In addition, extras and marketing factors are well below average, and these factors are not important to customers. The demand for product quality is average. The cluster is named "Price Sensitive".

The last, seventh cluster is small in terms of headcount, less than five percent of the sample. All factors are attitudes below average, but characteristics of product quality, price sensitivity and the presence of extras are not a significant factor when purchasing local products. I called the latter group "Uninterested."

**Report**

| Ward Method | | REGR factor score 1 for analysis 1 | REGR factor score 2 for analysis 1 | REGR factor score 3 for analysis 1 | REGR factor score 4 for analysis 1 | REGR factor score 5 for analysis 1 |
|---|---|---|---|---|---|---|
| 1 | Mean | -,2243269 | ,7809949 | ,5553898 | ,5394783 | ,4506760 |
| | N | 62 | 62 | 62 | 62 | 62 |
| | Std. Deviation | ,59004113 | ,67440513 | ,55879631 | ,60679102 | ,63340763 |
| 2 | Mean | ,1868250 | -,8126696 | -,4046222 | ,7832549 | ,3747190 |
| | N | 30 | 30 | 30 | 30 | 30 |
| | Std. Deviation | ,47995137 | ,72815291 | ,52543727 | ,63640268 | ,63164029 |
| 3 | Mean | ,3922392 | ,0671757 | ,6559665 | -1,3198983 | -,1843983 |
| | N | 31 | 31 | 31 | 31 | 31 |
| | Std. Deviation | ,51355436 | ,92934183 | ,74835194 | ,65422827 | ,76782067 |
| 4 | Mean | -,1549030 | -2,6068841 | 2,4097931 | -,0249080 | ,5415331 |
| | N | 4 | 4 | 4 | 4 | 4 |
| | Std. Deviation | ,55606922 | ,14807735 | 1,06395825 | 1,34506172 | ,96383229 |
| 5 | Mean | ,6107220 | -,0139093 | -,0839000 | ,2268242 | -1,0797763 |
| | N | 51 | 51 | 51 | 51 | 51 |
| | Std. Deviation | ,37042796 | ,81822756 | ,71395250 | ,63545843 | ,65845341 |
| 6 | Mean | ,0084389 | -,3330406 | -1,2834430 | -,5434078 | ,9026880 |
| | N | 35 | 35 | 35 | 35 | 35 |
| | Std. Deviation | ,85554985 | ,88472043 | ,91203498 | 1,04758822 | ,74597348 |
| 7 | Mean | -3,4678473 | -,3330712 | -,3070230 | -,8477585 | -1,2158755 |
| | N | 10 | 10 | 10 | 10 | 10 |
| | Std. Deviation | ,75854857 | ,56386864 | ,39767728 | ,39719857 | ,58571605 |
| Total | Mean | ,0000000 | ,0000000 | ,0000000 | ,0000000 | ,0000000 |
| | N | 223 | 223 | 223 | 223 | 223 |
| | Std. Deviation | 1,00000000 | 1,00000000 | 1,00000000 | 1,00000000 | 1,00000000 |

*Figure 4* The main characteristics of the clusters
Source: Own editing

**Summary**

In my research, I studied the acquaintance of the Békés County Depository, for which I completed an online questionnaire, which was completed by 223 people, regardless of age and gender. The questionnaire was completed anonymously, and I wondered how people were aware of the national values around them, which they might encounter on a daily basis.
I performed factor analysis and cluster analysis with IBM SPSS. It can be stated that the statements related to the same subject matter were placed in the same factor, hence their name was stated accordingly. Factor 5 was created, so the first factor was labeled Product Principal, Factor 2 was Marketing Aspects, Factor 3 was Producer Factor, Factor 4 was named Extras, and Factor 5 was named Price Sensitivity.

**Keywords**: rural development, Bekes county, national values, cluster and factor analysis

## Literature

EGRI Z. et al. (2009): Regional HDI as a territorial and social differentiation index in Central Europe. (2009) Megjelent: New elements and research in spatial economy pp. 167-180

EGRI Z. – KŐSZEGI I.R. (2018): A gazdasági-társadalmi (komplex) térszerkezet kelet-közép-európai képe. Területi Statisztika, 2018, 58 (1): 27–56.

JENES, B. 2012. Theoretical and Practical Issues of Measuring Country Image. Dimensions and measurement model of country image and country brand. Doctoral dissertation. Corvinus University of Budapest, 2012. - JENES B. 2014. Measuring Country Image and Country Brand in Settlement Marketing. In: Tózsa I. (ed.) Tourism and Settlement Marketing. E-Government Foundation, Budapest pp 47-54

TÓZSA I. 2014. Theory of settlement marketing. In: Tózsa I. (ed.) Tourism and Settlement Marketing. E-Government Foundation, Budapest pp 129 - 158 - TÓZSA I. 2016. National identity awareness and creativity. In: Tózsa I. (ed.) Proceedings of the First Workshop on Public Organization and Public Administration - NKE ÁKK, Budapest. pp. 55-66

www.ertektar.bekesmegye.hu

BELLETTI, G., MARESCOTTI, A., AND SCARAMUZZI, S. (2003): Paths of rural development based on typical products: a comparison between alternative strategies. In: Cristovao, A., Omodei, Z. L. (Eds.): Farmingand Rural Systems Research and Extension - Local Identities and Globalization.Fifth IFSA EuropeanSymposium Florence, ARSIA, Florence, 384-395.

ENDRIGHI, E. (1999): La valorizzazione delle produzioni tipiche locali. Dal concetto di valore alleindicazioni operative.Rivistadi Economia Agraria, 1, 3-26

FARKAS T. (2002): Rural development in the light of development theories and development concepts. Space and Space, 1, 41-57.

J. KÁPOSZTA, K. RITTER, ZS. KASSAI (2015): Investigation of the territorial importance of Hungaricums with special regard to pálinka

KÁPOSZTA J. (2007): Regional Economics. Szent István University Publishing House, K. Gödöllő

KIS, R. SZEKERESNÉ KÖTELES R. (2010): The Role of Local Action Groups in the Implementation of Competitive and Sustainable Rural Development.Tér és Társadalom 3, 119-135

KULCSÁR L. (ED.) (2006): Rural development. Szent István University, GTK, Gödöllő

LOWE, P., MURDOCH, J., WARD, N. (1995): Networks in Rural Development: Beyond Exogenous andendogenous Models. In: van der PLOEG, JD, van DIJK, G. (eds.): Beyond modernization: The impact of endogenous rural development. Van Gorcum, Assen, 87-105.

MOSELEY, M.J. (2003): Rural development: Principles and practice.SAGE, London

MURDOCH, J.. (1995): Sustainable rural development: Towards a research agenda.Geoforum, 3, 225-241. http://doi.org/d6hk74

# THE ROLE OF MUNKÁCSY MEMORIAL HOUSE IN TOURISM OF PEACE

*Klára GLÓZIK[1]*

[1]Szent Istvan University, Faculty of Agriculture and Economic Sciences, 5540 Szarvas, Szabadság str. 1-3, glozik.klara@gk.szie.hu

## Introduction

The Mihály Munkácsy Memorial House has been serving the town and art enthusiasts since 1994. Its purpose is to familiarize the inhabitants of Békéscsaba and the tourists visiting it with the life and work of Mihály Munkácsy, as well as with the nobility and civic traditions of the settlement in the 19th century. In the four rooms of the house, 21 original Munkácsy paintings depict his creative periods, from the master's early paintings, his realistic life paintings, his Parisian interiors and sketches to his religious paintings. In this world alone, this city is honored with a memorial house to the painter's oeuvre. This is why it is important to create thematic routes in Békéscsaba, because this is the way in which Munkácsy's life and work can be presented the most.

## Literature review

In Hungary, tourism has been developing dynamically for many years (Egri-Tánczos 2015, Egri 2014). In 2018, the number of overnight stays at commercial accommodations was 30.9 millions. The main motivation of the trips was visiting relatives and acquaintances, as well as holidays, fun and relaxation. Most of the time was spent in the Balaton region, and most trips to this region. The specific expenditure per capita was 5762 HUF. (KSH data)

*Thematic trips*

Thematic roads link natural and artificial attractions accessible through various modes of transport around a theme. Along with the principles of sustainability, the trails offer opportunities for learning, entertainment and relaxation.

The purpose of developing thematic tours is to generate interest, visit sites that are not in the travel guides, and sometimes offer free viewing to visitors. We also allow tourists to visit each of the attractions at their own pace and see as much detail as they like. There is no need to count the closing hours when viewing the attractions outside.

Thematic routes are usually cost-effective as they can be walked through without a contributor. However, there is a need for publications, bulletin boards and, of course, marketing. Although the routes can be walked alone, it attracts many more tourists if you have a tour guide, so you can get more information and interesting things. They make personal contact with visitors, answer questions, tell about the legends and history of the city. Walking a route, visiting sites can be free or subject to a fee. (Puczkó - Rácz 2011)

Of course, the routes can be viewed not only with the help of publications, tour guides but also with the help of an application.

In terms of their educational background, it is important to note that the proportion of those with secondary or tertiary education is visible when viewing thematic trips. (Jónás - Mónika Berki - Pál Horváth - Bulcsú Remenyik 2011)

Thematic routes are popular products among travelers. In Békéscsaba, several thematic routes have been created and are possible, such as the already completed Munkácsy Route, the Harruckern Historical Memorial Road, the Csaba walks. Thematic roads in Békéscsaba network the city and visitors can see the tourist attractions of the city.

*Introduction of Békéscsaba*

The geographical conditions of Békéscsaba are favorable, it is located in the southeastern part of the country, in the geographical center of Békés county, in the middle of the Körös-Maros. The city is located 200 km far from Budapest, 16 km far from of Gyula and 36 km far from Orosháza. The Romanian border is about 20 km far. The city meets the highways 44 and 47. Railway lines 120 and 135 intersect the town.

Békéscsaba and its region have good tourist facilities, based on gastronomic traditions, rich natural and built heritage and health tourism.

The most important tourist product of the city is the Csaba Sausage Festival, which is held every year and was first organized in 1997. The event has over 100,000 visitors over the years. In addition, Békéscsaba hosts numerous events such as the Spring Festival, the National Solo Dance Festival, the Csabai Carnival, the ZENIT Wind Orchestra Festival, the SCHERZO, the Textiles Conference, the Csabai Summer.

Békéscsaba is extremely rich in cultural and sacred values. The most complete collection and personal relics of Mihály Munkácsy's work can be found in the Museum named after the painter and in the Mihály Munkácsy Memorial House next door.

There are currently two four-star and four three-star hotels in Békéscsaba. In addition to four guesthouses and six dormitories, there are several private accommodation facilities. The accommodation is filled with a full house during the Sausage Festival, and during this time it is difficult to find accommodation around April. (Tourinform Békéscsaba)

The most important cultural tourist monuments of Békéscsaba are related to the name of Mihály Munkácsy, therefore it should have a decisive role in the cultural offer. Mihály Munkácsy is one of the most well-known artists in Hungary today, and is one of the outstanding tools of tourism in Békéscsaba.

There are several places in the city that are related to the painter, his family and his life. These places should be supplemented with signs, tourist guides and thematic routes should be created for them, so that tourists, besides relaxation and acquiring knowledge, can get rich from Békéscsaba as well.

Munkácsy arrived in a town with 23,400 people (Czeglédi 2004) in the Great Plain, which at the same time was rather rustic. However, the rural and urban lifestyles did not differ much. Csaba had a market town right.

**Material and method**

The aim of the research is to examine the motivation and interest of the visitors arriving here. To investigate the connection between the names of Békéscsaba and Mihály Munkácsy among the visitors, to highlight the shortcomings of the other tourist attractions of the city, and to identify the shortcomings of the visitors' needs and to ask them to propose a change.

In order to achieve the above objectives, we conducted a paper-based questionnaire survey with my student Tímea Laszkó at the Munkácsy Mihály Memorial House as a primary research. A total of 100 questionnaires were completed in the research on 01/11/2018. -01/02/2019. period. The questionnaire contained 11 questions, of which 10 closed and one was open-ended.

The questions covered the following topics:

Where did the visitors come from and what information source was used to select the settlement. What influences them when choosing a destination. Are you interested in other sights of Békéscsaba, if so, how would you like to get to know them? Of course, we thought it was important to share ideas for improvements.

**Results**

After processing the questionnaire, I would like to present the most important results based on the answers given below.

*Segment your audience by location*
The distribution of tourists by place of residence during the period under review was as follows. Most came from the West-Transdanubian and Central Hungarian regions. This is followed by the two Great Plain regions. The smallest percentage of visitors came from Central and South Transdanubia. In addition, visitors came from Slovakia, Germany, Transylvania and other countries, and they appear in their other datasets. The majority of the participants in the research indicated that they were visiting Békéscsaba for the first time.

*What are the 3 things that come to mind first when you hear the name of a city?*
The participants mentioned Mihály Munkácsy, the Sausage Festival and the brandy in Békéscsaba, almost without exception.

*How do you get information about the Munkácsy Memorial House?*
During the survey, I was curious as to how those coming here would know about the city. The research has clearly shown that the Internet plays a major role as an information channel. Most of them have learned about the Internet, but some have heard about Békéscsaba at the Tourinform office or from a friend and decided to visit the city.
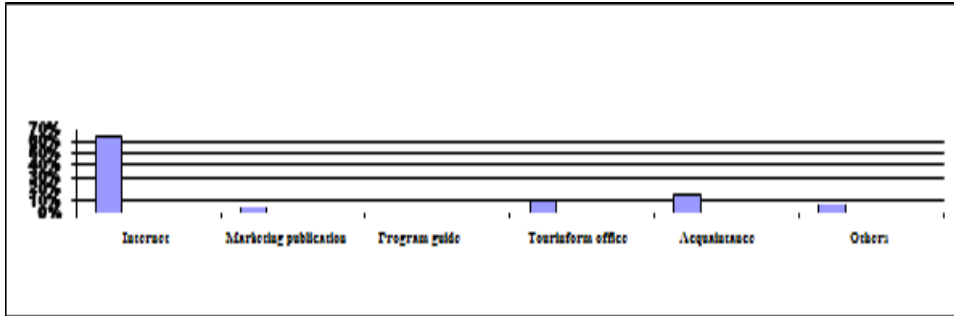
Figure 1: How did you get information about the Munkácsy Memorial House?
Source: Own research (2019)

*What factors influence your choice of destination?*
Before you travel, the most important thing is to determine your destination, which is best served by travelers, as they find almost everything from accommodation to attractions, although in many cases they are out of date. In addition, they can choose from destinations based on reports from friends and friends.
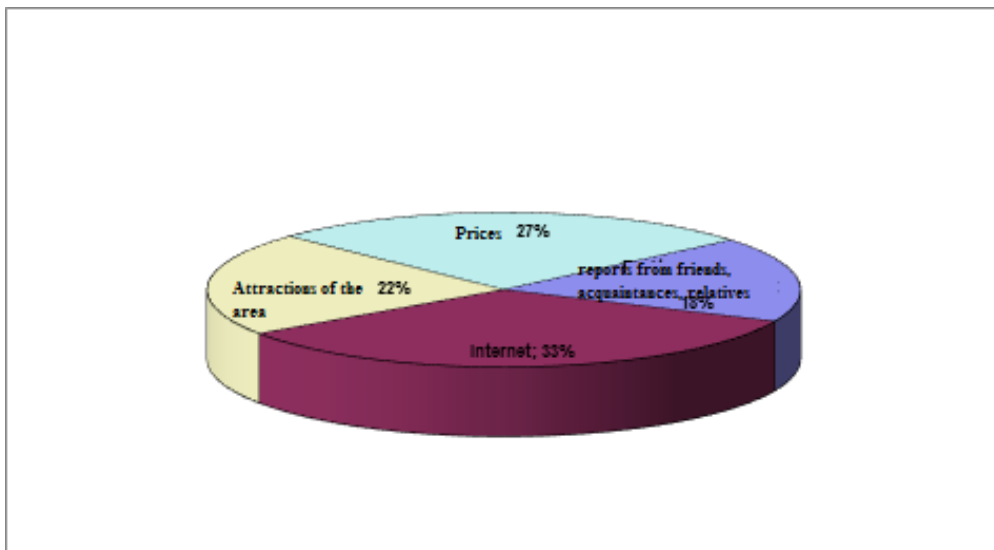


*Figure 2:* Factors influencing destination selection
*Source:* Own research (2019)

*What would you like to do in this area?*

In the questionnaire, besides the questions about the Munkácsy Memorial House, I talked about what tourists want to live in the area, what are the programs and needs they want to try. They were given several answers to the question. Most of the respondents would like to spend their holidays bathing and hiking in the countryside.
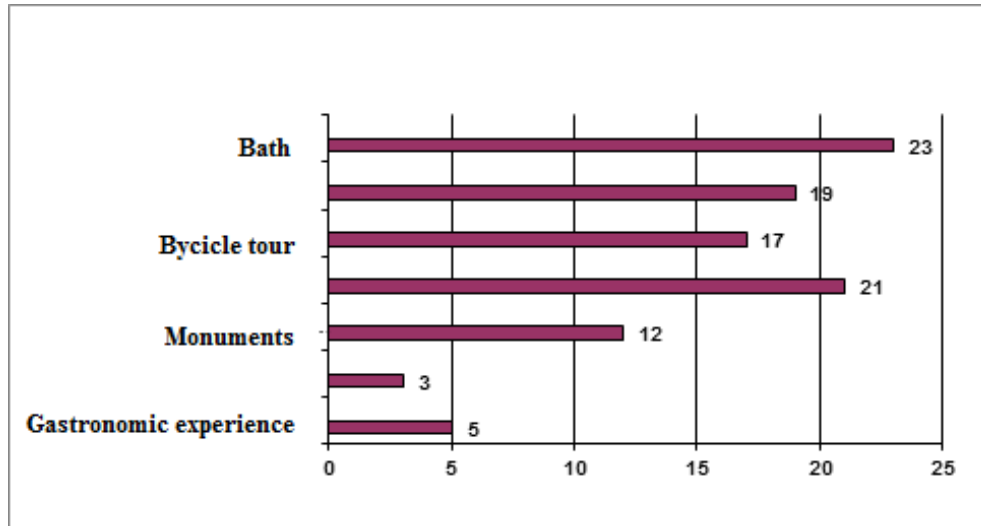


*Figure 3:* What do you want to do in this area?
*Source:* Own research (2019)

*What is the main attraction of the city for you?*

The results obtained suggest that interactivity and the active involvement of visitors in the process of knowledge transfer are becoming increasingly important expectations. Tourists are primarily looking for experiences and memories, so it is important to use the right methods. We asked the tourists what was most interesting and attractive to them in the city. The majority of respondents marked several answers. First came the proximity of the town, Mihály Munkácsy and the architecture of the town.

*Mark the statements that characterize the city.*

The results obtained suggest that interactivity and the active involvement of visitors in the process of knowledge transfer are becoming increasingly important expectations. Tourists are primarily looking for experiences and memories, so it is important to use the right methods
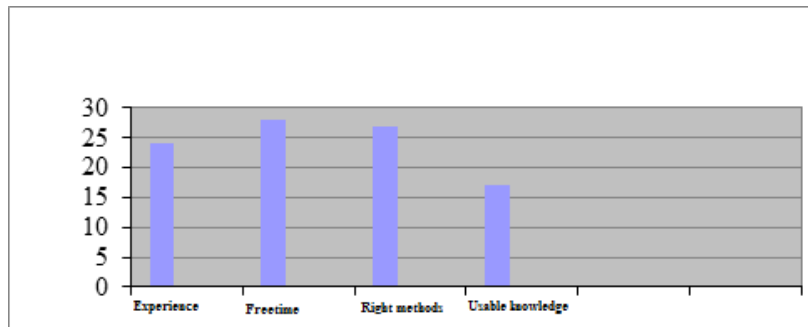
Figure 4: City-specific statements
*Source:* Own research (2019)

**Summary**

Tourism marketing of different locations has a relatively long history, however, the types of destinations that are considered to be attractions are gradually expanding; Békéscsaba and Mihály Munkácsy Memorial House belong to this latter group. Developments in the Munkácsy Cultural Quarter, building on existing facilities, can be an attractive attraction in the future that will encourage tourists to stay longer.

The research shows that all groups, regardless of where they live, visit programs and venues that provide them with a new and lasting experience and promote their cultural development.

It is extremely important for those arriving with their families to keep their children engaged. It is ideal for them to visit different active programs, eg. Night of museums.

In addition to completing the questionnaire, we personally asked visitors what they prefer for the city's sights. Most of the respondents chose the Munkácsy Mihály Museum, the Munkácsy Memorial House and the churches. But they would like to be part of a theme-driven journey. As Békéscsaba has many wonderful and interesting buildings, it is of natural value that several thematic routes could be created.

The study also found that some tourists wanted more background information, and some had suggested more active marketing and advertising.

**Keywords**: Mihaly Munkacsy, Bekes county, monuments, tourism

**Literature**:

Imre Czeglédi (2004): Munkácsy in Békés County. Directorate of Békés County Museums, Békéscsaba.
Egri Z. (2014): A város- és várostérség-tipizálás alapjai Kelet-Közép-Európában. (2014) TÉR ÉS TÁRSADALOM 28 (2): 87-104.
Egri Z. – Tánczos T. (2016): Spatial Layers and Spatial Structure in Central and Eastern Europe. Regional Statistics, Vol 5, No 2. 2015: 34–61.
University of Pécs (2011): Tourism Product Design and Development. Farkas Kempelen Student Information Center, Pécs, Mónika Jónás-Berki - Bulcsú Pál-Remenyik Horváth: Theme parks, roads, 9.
László Puczkó - Tamara Rácz (2011): From Attraction to Experience. Akadémia For rent, Budapest.

Web Source:
www.ksh.hu
www.tourinform.hu

# SOME ASPECTS OF RURAL DEVELOPMENT IN HUNGARIAN AGRICULTURAL LITERATURE AT THE END OF 18TH CENTURY

*Éva TÓTH [1] – Gábor LUKÁCS [2] – Zsuzsanna BACSI [3]*

[4]  University of Pannonia, Georgikon Faculty, te@georgikon.hu
[5]  University of Pannonia, Georgikon Faculty, lg@georgikon.hu
[6]  University of Pannonia, Georgikon Faculty, bacsi-zs@georgikon.hu

## Introduction

The first Hungarian agricultural authors, who founded the Hungarian scientific agricultural literature at the end of the 18th century, already addressed the need to develop the country. They have already written about the necessity of the development and improving the situation of the poor people in the Hungarian rural areas. In practice a determining role was played in the development by the Hungarian feudal large estate, which was a socio-economic unit. The most illiterate, poor peasants learnt only the practice of agriculture.

## Literature review

According to Káposzta and Tóth (2013) there is no uniform way of using the term „rural development" in the European Union. Most of the time the image of the rural regions is associated with negative values, or it is interpreted as the opposite of the urban areas, (as in urban-rural relationship), or it is considered exclusively as the premises of agricultural production.

The most important rural functions include the determination of the quality and quantity of the food supply by agriculture; the protection of natural resources; the provision of recreational conditions; the preservation of biodiversity.

The European Union has initiated programmes to support the above functions. The European Commission has established three comprehensive priorities for rural development policy:

- -Fostering agricultural competitiveness;
- -Ensuring sustainable management of natural resources and climate action;
- -Achieving balanced territorial development of rural economies and communities, including the creation and maintenance of employment.

For the 2014-20 programming period, the European Agricultural Fund for Rural Development (EAFRD) focuses on three main objectives:

- -fostering the competitiveness of agriculture
- -ensuring the sustainable management of natural resources, and climate action
- -achieving a balanced territorial development of rural economies and communities including the creation and maintenance of employment.

Similar to the above goals, at the end of the 18th century Hungary also suffered from the wasteful usage of common resources, from the unsustainable exploitation of the forests, and from the low efficiency of human resource application (the drudge of serfdom).

Subsidiarity is one of the main principles in the EU, and this should have been very important at the end of the 18th century, too. The absenteeism of feudal landlords was harmful from the viewpoint of investments and management, while it was typical that the landlords lived far from their estates in those times. The income generated by the lands was not used for developing the estates, and the management of the estates was not taken seriously, therefore the technology level of agricultural production was very underdeveloped. The lands of the estates were farmed using the tools of the serfs. There was no trained labour in many such manors, and the beliefs and superstitions regarding farming were passed from father to son, agriculture was not considered as a science. At the same time, with increasing monetary incomes the more costly investments became attainable, and the more cost-intensive animal husbandry activities gained popularity. As Gunst (1982) explains, the impacts of the business booms encouraged landlords to modernise the production technology applied in their manors and estates. Production for the market and the income-oriented approach gained ground in the estates, and the character of the estates started to change, the exclusively cereal growing farms slowly disappeared.

At the beginning of the 19th century the production technologies of small-scale and large-scale farming started to diverge, as well as their the objectives of production. The small-scale farms continued to produce for self-sufficiency, for the owners' consumption, while for large estates market-oriented production and the monetary income became the key objectives. This process of differentiation, however, had not been completed by the middle of the 19th century, because of the availability of serf labour and the lack of capital.

At the turn of the 18th and 19th centuries agriculture had been increasingly accepted as a science, and during this period Lajos Mitterpacher (1734-1814), Sámuel Tessedik (1742-1820), Ferenc Pethe (1763-1832) and János Nagyváthy (1755-1819) became the founding fathers of Hungarian agricultural scientific literature. This was the time when the first agricultural vocational education institutions were established: Mitterpacher taught for a short time at the university in Pest, Tessedik founded a school at Szarvas, and Festetics and Nagyváthy did the same at Keszthely.

János Nagyváthy (1775-1819) played an outstanding role in the agricultural history of Hungary, he was the most eminent Hungarian practical („practicus") agricultural expert in the enlightenment period. Although his theoretical knowledge did not go beyond that of his teacher, Mitterpacher, he was not such an enthusiastic and engaged organiser as Tessedik, the school founder clergyman in Szarvas, but either previously, or later, nobody wrote so valuable and essential books about the agricultural profession in Hungarian, as Nagyváthy.

His book entitled „A szorgalmatos mezei-gazda" („the diligent farmer") published in 1791 was the first systematic scientific book of the agricultural profession written in the Hungarian language, which was a groundbreaking work, because previously the practice of farming was largely based on folk wisdom and superstition. He wrote his book in the mother tongue of the despised „sweating Hungarian farmer", to „help the labour of his fellow countrymen, whose poverty prevent them to spend money for learning foreign languages".[5] It was Nagyváthy who, by his work, shaped agriculture

---

[5] Nagyváthy, J. (1791): A' szorgalmatos mezei gazda. Elől-járó beszéd.

into a science that is cultivated in Hungarian, and thus he gave scientific prestige to the profession, formerly considered a „folk wisdom" in the public opinion of Hungary.[6]

**Material and methods**

Our research is based on the resources available in libraries and archives. For the paper we collected descriptions, opinions, approaches and arguments related to the concept of rural development both in theory and in practice at the era of the enlightenment.

**Results**

According to Nagyváthy's conception the basis of the modernization of the large estate was the development of animal husbandry; "the basis of farming is the hay and fodder production and animal breeding (…..)"[7]. He recognised in good time -, and this was proven by researchers later - that "the development of animal husbandry resulted in the increase of agricultural production for the market and it had a favourable effect on the level of plant growing."[8] Nagyváthy concluded, that „where breeding is flourishing, it shows that the farmers are wealthy, because breeding requires capital"[9]. However, on the Festetics estate there were no means of capital investment, therefore the only way of attaining profitability of the different enterprises was the modernization of the production technology, the introduction of professional farming methods and careful planning. Nagyváthy assigned an crucial role to animal husbandry not only in developing production, but in improving profitability, too. Apart from emphasizing the need to reach the highest profit possible, he also pointed out that from the stocks "as many must be sold at the best price as the number that can be substituted by breeding", and in this way future replacement would not be risked[10]. The planning and organization of production became much easier this way, because then the farmer was able to calculate "the income this year or even in the next year, beyond the different animals which were gathered for trading." [11]

Besides promoting the development of animal husbandry, he demanded complex whole-farm level organizational practice: the complex development of plant growing and animal husbandry was in the centre of his concept: "On the one hand the farmer strives for good and abundant yield, on the other hand he must insist on breeding cattle and other animals"[12]. He recognised that plant growing could not become intensive in a short time, because of the applied technology and tools – ie. serfs providing both the labour force and most of the tools.

In order to develop production he encouraged the expansion of commodity connections between the various enterprises and suggested growing new crops. He emphasized the role of fertilizing in the renewal of allodial plant production and called manure and manuring "the heart and soul" of crop growing. He stated that "One cart of mature

---

[6] Borotvás-Nagy, S. (1942): Nagy magyar gazdák. 39. p.
[7] Nagyváthy, J. (1795): Közönséges Instructio. m. 134. p. (V. pont)
[8] Ciepelewski – Kostrowica – Landau – Tomaszewski (1974): i. m. 64. p.
[9] Nagyváthy, J. (1822): Magyar Practicus Tenyésztető. Pest. V. p.
[10] Nagyváthy, J. (1795): i. m. 280. p.
[11] Nagyváthy, J. (1795): i. m. 280. p.
[12] Nagyváthy, J. (1795): i. m. 145. p.

manure ploughed in the right time is better than six carts of immature manure, and every spring the dung must be collected in the pens and left to maturing for a year."[13]

Before the publication of Nagyváthy's book Sámuel Tessedik (1786) had published his book first in German, later in Hungarian, entitled „A parasztember Magyarországon mitsoda és mi lehetne ..." (What could the farmer become in Hungary…), in which many ideas and thoughts are expressed about the development of the countryside, the rural areas. The book described the ideal village, stating, that „the lifestyle of people in Hungary is very simple". It is no surprise, that Tessedik, the school builder clergyman in Szarvas, explains the backwardness of Hungary by „the lack of good, and especially experienced farming schools", and by „how many brave, labourious and rich citizens must the country loose, because the education of the young did not let the buds of good and diligent working man flourish. In one word, the undeniable truth is, that the good schools are the origin of the blessings and happiness for a country and a nation, while the opposite will have to lead to economic losses and unhappiness ".

He considered it important to keep the well trained professional people (e.g. teachers) in the countryside (which is similar to the current rural development goals), and their continuous training is also essential: „You are entrusted with the task of sharpening the human mind. What is the use of sharpening the mind without enlightening it and without improwing the will? Show the peasant how ignorance, stupidity and superstition lead to his poverty and misery". Tessedik gives voice to the attempts to subsidiarity and transparency, when he recommends the setting-up of a bulletin board, on which not only news, but trade data could also be announced. „The master will set up this bulletin board between the church and the school and will maintain it". This „suggested bulletin board will make it easier to arrange trade, the sales and purchases". Tessedik also mentioned the development of the local economy and the increased purchase power of the nobility: „Perhaps more money would flow among the peasants if the landlords, those who are not prevented by an obvious official position, would live not in the distant cities but at their own estates, and would spend their own abundant money there, and at the same time they could see with their own eyes, and learn to understand, what deficiencies their own serfs suffer from".

Tessedik has expressed intriguing practical thoughts about the protection of human rights, and capital punishment: „Would it not be more useful for the monarch of the country, the village, the peasant population, and even for the rouges themselves, if they, instead of being hanged, or executed by the breaking wheel, would be condemned to work on building the most needed roads or dig dikes and ditches? Why would criminals worry about death penalties? But if they would have to struggle at ditch digging or labouring on roads, for 10, 12, 15 or 20 years, then even the most stubborn villain would improve and become pious and a better man."

**Conclusions**

During the times of the enlightenment the agricultural publications written in Hungarian showed awareness of not only the backwardness of agricultural production, but of the underdevelopment of the society and economy of the country, and suggested new ideas, „action plans" – tasks to initiate improvement.

---

[13] Nagyváthy, J. (1795): i. m. 142. p.

The analysed authors, János Nagyváthy and Sámuel Tessedik created a rich knowledge base, which goes far beyond the ideas for modernising agriculture. In the times of the enlightenment, parallel to the trends in Europe, ideas are expressed about overcoming social backwardness, establishing a profitable economy, and occassionally, about the liquidation of feudal conditions. It might not be an exaggeration to say, that the wise farmers who died 200 years ago (Nagyváthy in 1819 and Tessedik in 1820) were the pioneers of rural development in Hungary, and the forerunners of modern management science.

## Summary

„*There is nothing new under the sun*": people of the past had had to face very similar problems as the citizens of the European Union today: the uneven (sometimes unfair) distribution of resources and the resulting problems of inefficiency, the narrow-mindedness and lack of knowledge, that hinder development,  lack of capital that impedes modernisation, and the difficulties of information flow (either regarding the market or technical knowledge).

**Keywords:** agricultural history, rural development, feudal large estate, management system

## Acknowledgement

## Literature

BOROTVÁS-NAGY S. (1942): Nagy magyar gazdák.

CIEPELEWSKI J., KOSTROWICKA I., LANDAU Z., TOMASZEWSKI J. (1974): A világ gazdaságtörténete a XIX. és a XX. században. Budapest.

HUSZÁR, M. (2019): Evangélikus nemesi családok gazdasági és társadalmi jelentősége a Marcali járásban a 19-20. században. In: Reformáció a Dél-Dunántúlon. Szerk.: Borsy Judit, Magyar Nemzeti Levéltár Baranya Megyei Levéltára, Somogy Megyei Levéltára, Tolna Megyei Levéltára, Pécs - Kaposvár - Szekszárd, 2019. 277-294.

KAPOSI, Z. (2019): Uradalmak, földbirtokosok és birtokforgalom a Dél-Dunántúlon a 19. században. Budapest, Magyarország: Magyar Mezőgazdasági Múzeum és Könyvtár (2019) , 200 p. ISBN: 9789637092855

KÁPOSZTA J., TÓTH T. (2013): Regionális és vidékfejlesztési ismeretek /Elméleti jegyzet/

KURUCZ, Gy. (2016): Adminisztráció, gazdálkodás, adósságkezelés: Gróf Festetics László pénzügyi helyzete az apai örökség átvételétől a zárgondnokság időszakáig (1820-1830). SZÁZADOK 150 : 3 pp. 535-584. , 50 p. (2016)

NAGYVÁTHY J. (1791): A' Szorgalmatos Mezei-Gazda. A Magyarországon gyakoroltatni szokott gazdaságnak rendjén keresztül. Pest, I-II. kötet.

NAGYVÁTHY J. (1795): „Közönséges Instructio a Mltgos Tolnai Gróf Festetits György Királyi Kamarás Urodalmiban gyakoroltatni szokott Gazdaságnak rendjén keresztöl" (kézirat).

NAGYVÁTHY J. (1820): Magyar házi gazdasszony. Pest.

NAGYVÁTHY J. (1821a): A magyar gazdatiszt, Pest.

NAGYVÁTHY J. (1821): Magyar Practicus Termesztő. Pest.

NAGYVÁTHY J. (1822): Magyar Practicus Tenyésztető. Pest

TESSEDIK S. (1786): A parasztember Magyarországon mitsoda és mi lehetne ... (Ford. Kónyi János) Pécs, 1786. 508 lap

# ENHANCING RURAL LIVELIHOODS BY DIVERSIFICATION - TRANSYLVANIA

*Gabriella BÁNHEGYI* [1] *– Annamária SÁNDOR*[2] *– Ervin SÁNDULY*[3]

[1]University of Pannonia Georgikon Faculty, 8360 Keszthely, Deák F. u. 16, banhegyi@georgikon.hu
[1]University of Pannonia Georgikon Faculty Székelyudvarhely University Centre
[3]University of Pannonia Georgikon Faculty, Székelyudvarhely University Centre

## Introduction

Rural development in the European Union became the so called second pillar of the common agricultural policy in the '90s. Identifying the distinguishing challenges rural areas battle with is not too difficult, however, finding the cure for the problems of the declining and aging rural population, lack of jobs and income, lack of infrastructure, unfavorable (compared to urban areas) housing, service, healthcare and educational conditions, etc. is what makes rural development a challenge for all stakeholders. While identifying the economic potential of each rural community is very important, long term sustainability draws attention to social and environmental considerations as well. Thus, economic activities that contribute to the local, regional social cohesion and at the same time conserve all values that nature and environment provide should be the first choice. Agriculture which was traditionally the number one income source in rural areas is facing serious challenge in a globalized world of intensive trade of agricultural products. Among the member states of the European Union Romania has the highest numbers of agricultural households and holdings with an overwhelming presence of miniscule farms that beside of some self-subsistence performance hardly can provide a sound and secure income for families. Therefore finding new ways, new methods for maintaining rural livelihoods is a must and diversifying the rural economy can be the answer to the nagging question of how. In this paper some possible aspects of diversification is examined.

## Literature review

Successful rural development programs are to be based on the networking of the different stakeholders of the rural areas. Member states of the EU are different in their preparedness of creating and maintaining this network and the big question is whether successful networking adds to the success of RD programs and if so, in what extent.
The RD program for Romania was adopted in 2015 by the Commission, went under some modifications in 2018 and have an EU budget of some 8 billion euros for that purpose which is summed up with a bit more than 1 billion euro from the national budget for the 2014-2020 period. Taking into consideration that roughly third of all EU farms are located in Romania, that about 20 percent of the total Romanian employment is in the agriculture and by all estimates 40 percent of the rural population is at risk of poverty and social exclusion, we can emphasize the great importance of finding the right development tools. Small scale agriculture is present with low level of full agricultural training, or skills and rural Romania has only 18 per cent of the non-agricultural SMEs, while the average income in rural areas is only 67 % of that in urban areas (EU average of 80 % respectively) (European Commission, 2017).

There are other and very much related factors to be taken into consideration while planning rural development programs for the country. The population of the country is decreasing with an alarming rate due to the negative natural growth and migration. While - according to the National Institution of Statistics of Romania the population peaked around 23 million in the '90s, by 2019 the estimate is only a bit over 19 million. Age distribution shows the same threat especially when examined in the course of time. Concerning rural areas it is even more essential to find an appropriate solution for out-migration and declining population. Rural livelihood enhancing tools however should be harmonized with preservation goals concerning the ecological potential of the country.

Tourism plays an increasing role in the Romanian economy. In their paper Mazilu et al report about a definite growth in the number of visitors. Compared to the total number of tourists of 5.1 million in 2012 by 2017 more than 8 million tourists visited Romanian destinations. The increase is especially high in the case of foreign tourists (from 795 thousand to 2.287 million) (Mazilu et al, 2018). Though the rate of the increase is considerable we should note that revenue from tourism is lagging behind compared to other smaller countries. In Romania the number of establishments providing accommodation for visitors grew from about 5 thousand to a bit over 7 thousand between 2011 and 2016. At the same time in Hungary (with her 93 thousand $km^2$ compared to the 238 thousand $km^2$ of Romania) the number of establishments almost doubled in the same period reaching 4.8 thousand in 2016 (Eurostat, 2019).

Among tourism related policies and programs in Romania the Eco-Tourism Strategy and the National Strategy for Spa Tourism should be mentioned, both part of the long term strategy for the tourism sector between 2007-2026 (OECD, 2014)

Romania certainly has a vast potential in rural tourism. Marian quotes Middleton and Hawkins who in 1998 formulated a definition for rural tourism. According to this definition rural tourism is closely linked to the rural area that constitutes the tourist destination. (Middleton and Hawkins, 1998, p.87 in Marian, 2017). Agri-tourism is a form of rural tourism providing accommodation on or close to the farm and/or offering homemade food or other products to visitors and/or possibility of taking part in the farm- or related activities. Considering the vast numbers of small holdings in Romania it seems a possible area of interest to develop in rural regions.

On another note diversification certainly does not mean that all local actors should be engaged in the same e.g. rural or agri-tourism services. Small farm based enterprises might not have the necessary capital, labor capacity and knowledge to launch an agri-tourism undertaking, though can successfully benefit of the like activities of other neighboring farms who can direct tourists to visit their places and buy their products. (This is a known and spreading practice among networking farmers who operate open farm programs). By all means, agricultural activity when limited to a small-scale farming can focus on alternative products avoiding the intensive competition of bulk products where they cannot compete. Alternative sectors of the agriculture can vary and local resources should be considered when choosing among them. Herbs and spices and especially medicinal herbs grown and collected (and processed) in an undisturbed rural area are recognized as marketable products that can be directly sold to the customers creating a short supply chain that can be beneficial for both parties (seller and buyer). The production area for medicinal herbs and spices is growing in Romania (in 2011 its

estimated size was 11 thousand hectares compared to the 7.4 hectares in 2007) but still small. In Hargita County the total support area registered for herbs and spices production was only 6.7 ha in 2016 according to the APIA.

**Material and methods**

The first research activity focused on rural tourism related enterprises and was carried out by a member of our team during 2018 spring. Questionnaires of 26 open-ended and closed-ended questions were distributed directly to 25 entrepreneurs engaged in rural-tourism related activities in Hargitha County, Romania. During or after the filling in the questionnaires respondents also took part in mini interviews. Answers were analysed by simple descriptive statistics and results though by no are representative can create a sound foundation of further research.

The role of the collection, production, processing and marketing of medicinal and other herbs was chosen as a second possible research area. Primary research in 2019 included interviews with three businesses engaged in production/processing/marketing one of the participants also is the president of the Medicinal Herb and Spices Association of Székely Land.

**Results**

*Rural/Agri tourism*

Hargita county can be found in Eastern Transylvania, Romania. The territory of the county is 6639 km$^2$ with a steadily decreasing population of 304.280 in 2018. Population density is 45 inhabitants / km$^2$, the county belongs to the predominantly rural areas that compromise more than 67 per cent of Romania with 53 per cent of the populations living here. The per capita GDP was 5.900 euro in 2016 which puts Hargita to the 31$^{st}$ place in the ranking of the 42 counties (respective per capita GDP for Romania was 8600 euro and 29.300 euro in the EU28) (EUROSTAT, 2019). The climate and topography conditions limit the number and effectiveness of possible agricultural activities, and one-third of the territory is covered with forests. The Romanian transport infrastructure is one of the least developed in the EU, its development is a slow process and accessibility is essential for reaching possible attractions and destinations. The Tourism Strategy of Hargitha County was published in 2009 and gives a detailed inventory of the various resources of tourism (natural, cultural, religious, etc.).

All participants in the research were first generation entrepreneurs, the majority (80%) of them started their activity after year 2000. All but one of the respondents were women and except four of them who were younger they belonged to the 45-64 year age category. 88 percent of them has more than one business activity but all ranked their hotel-restaurant-tourism undertaking as their main source of income. The majority of the respondents started the hotel-restaurant business in their own house, and slowly were able to extend the capacity through new investments. One third of the respondents think that starting business were rather easy because in the 2000's more and more tourists – especially from Hungary – visited Transylvania. All respondents reported that later they experienced a set-back and related this to the global crisis years and to the increased number of participants in the hotel-restaurant-tourism sector. Most of the entrepreneurs operate as a family undertaking, all the necessary activities performed by

the family members. 20 per cent of the entrepreneurs employ 1-5 temporary employees usually during the summer months. Regardless of the presence of seasonal employment respondents emphasized that hospitality shown by the owner of the establishment has a special value added to the service they provide. As for the question about the marketing activity, 80 per cent has a website and use the social media platforms. Still, they think that the best advertisement is the satisfied guest who recommends their establishment to others. 70 per cent of the respondents provide accommodation and meal, while 30 per cent provide only the accommodation (by renting out guest houses). The latter ones cannot be considered as typical rural/agro tourism service as the owners has only a rather distant connection with the guests.

Half of the participants have 10-15 people's capacity as most in the offered accommodation. Capacity of over 40 persons was reported only in one case. 72 per cent of the respondents has rooms with bathroom for 2-3 persons. Rooms accommodating more people usually don't have own bathroom, the guests are to use shared bathrooms, and thus this kind of accommodation represents a lower quality level of service offered at a lower price level. More than half of the respondents reported about at least one apartment included in the establishment. While television, heating in the rooms and cooking facility in the garden (garden grill, fireplace) is included in 72 per cent of the establishments (24 per cent have a common room for the television) only one has air conditioners in the rooms. Some mentioned extra services such as Jacuzzi, wood bathtubs, sauna, etc.. Guests spend an average 3-4 nights at the establishments and time their stay around holidays or so called long weekends. Typically, guests arriving for a shorter stay usually spend only a night (in transit).

As for extra services, 90 per cent of the respondents offers help for organizing guided tours, and have contacts for organizing hunting and/or fishing tours or wildlife watch, two of them can organize mounted tours. Agriculture related activities are offered by 20 of the respondents but only 3 entrepreneurs can provide it in their own farm. Not surprisingly only these 3 are able to sell their own home made products to the guests. The majority of the guests arrive from Hungary (80 per cent), followed by Romanian tourists. Altogether 75 per cent of the guests are foreigners. There is a high rate of returning guests – all respondents spoke about at least 50 per cent. Command of language was mentioned as one of the major barrier when welcoming guests as more than two-third of the hosts speak only Romanian and Hungarian.

Answering the question about the necessary developments respondents mentioned roads, public services (gas, electricity water, sewage) and better operation of RD and TDM organizations.

*Medicinal and other herbs*
One of the visited family herb farm is operated by a family of five. The utilized agricultural area of the farm is only 1 hectare but with careful planning they can harvest herbs three times a year. Cultivation, sowing-planting, harvest and the following processing is labour intensive and the family does all work without any mechanisation. Products are one-component teas, tea mixes, ointments, tinctures, essential oils. As medicinal herbs and the products made from them are subject to a certification procedure, the farm have about 45 samples examined every year. The owner of the farm

told that market demand is huge and they could sell much more than they do had their capacity allowed it. Packaging, design and providing information is a must.

The lavender farm covers about 0.7 hectares. The owner of the farm chose this plant because of the moderate requirements of the plant production and the various utilisation possibilities. As the family operates another business (shop and cafe) they can directly sell the products of the lavender plantation (syrup in the cafe, various dried lavender products in the shop).

All interviewees shared that medicinal and other herbs were an integral part of their families, they remember that grandparents were involved in collecting and processing plants and the family used the products - usually tea – they made for themselves. The family ties thought to be one of the most important motivations for starting their undertakings, the other the need for increasing family income. Mere collection of herbs cannot make a business undertaking successful, the interviewees produce and process and market their products. Both owners think that customer satisfaction is the most important way of advertising their products. Both told that herb and spices producers usually cooperate well with each other, they organize special events, create learning opportunities, and usually have their own loyal customers. Products are sold as much as possible trough short supply chains and due to the limited production capacity it is unlikely that big stores would sell their products. What is more they find that their customers are more willing to pay the higher price they ask for than to buy similar products of other brands in supermarkets (just for comparison: one package 40 gram mint tea costs about 3,5-4 RON in the supermarkets while one of the interviewees sell the 40 gram bulk mint tea for 11-12 RON). Both farms offer educational programs for children and participate in open farm programs.

## Conclusions

Due to economic necessity, or as a promising business carrier several new establishments started operating in the rural tourism sector and benefited from the increased interest in the Transylvanian region. The majority of tourists arrive from Hungary but it would be a sound objective to attract more people from domestic tourism and from other countries. Major obstacles seems to be lack of infrastructure and of speaking/understanding languages. Medicinal herbs might also become a major income source when people turn toward traditional healing, health maintenance methods. In Transylvania herbs related knowledge developed in an undisturbed natural environment and passed from generation to generation. The increase of interest in herbs should be and is supported by several educational program addressing both consumers and producers.

## Summary

Diversification in agriculture requires careful planning but can be triggered by economic necessity as it happened in the Transylvanian region of Romania. Undertakings engaged in rural tourism and medicinal herbs were visited in Hargita County during the research. Primer data was collected through questionnaires and

interviews. Simple descriptive statistics was used to process and present the obtained data.

**Key words:** Rural tourism, medicinal herbs and spices, rural enterprise, diversification

**Acknowledgment**

**Literature**

European Commission: 2015. Romania's Rural Development Programme for 2014-2020. https://ec.europa.eu/agriculture/sites/agriculture/files/rural-development-2014-2020/country-files/ro/press-summary-26-05-2015_en.pdf (retrieved 10. 25. 2019)

European Commission: 2017. Country Report Romania 2017. Commission Staff working document.

Eurostat: Real GDP per capita.

https://ec.europa.eu/eurostat/databrowser/view/sdg_08_10/default/table?lang=en (retrieved 10. 25. 2019)

Marian I.: 2017. Rural tourism and agro-tourism in Romania. Ovidius University Annals, Economic Science Series. Volume XVII. Issue 2/2017. 226-231

Mazilu M. – Dumitrescu D. – Marinescu R. –Baltalunga A.: 2018. New trends in Romanian Tourism in 2018. Journal of Tourism and Hospitality, Volume 7, Issue 4 p 6.

Middleton, V., Hawkins, R., 1998, Sustainable Tourism: A Marketing Perspective. Butterworth Heinemann mentioned in Marian I.: 2017. Rural tourism and agro-tourism in Romania.

National Statistical Insitute of Romania (2015)

Nedelcu S. – Apostol M. –Popa D. – Ionita M – Grebau B. – Raiculeasa D. P.: 2017. Labour force in Romania, Employment and unemployment, NIS.

OECD (2014), "Romania", in OECD Tourism Trends and Policies 2014, OECD Publishing. http://dx.doi.org/10.1787/tour-2014-53-en

Tourism Development Strategy for Hargita County, 2009; Council of Hargita County, Aquaprofit, p 287.

# POSTER SECTION

# EFFECT OF THE 2014-2020 COMMON AGRICULTURAL POLICY'S ONTO THE ARICULTURAL AREAS

*Attila RÁKÓCZI*

Szent István University – Faculty of Agricultural and Economics Studies, H-5540 Szarvas, Szabadság út. 1-3., rakoczi.attila@gk.szie.hu

## Introduction

The latest reform generated by the CAP has brought many new requirements for farmers related to the payment of agricultural support. Among these are the spectrum of greening requirements. During our research we examined the land using data in the county from 2009 to 2019. We analyzed the statistics from the perspective of area-data and use of land.

## Literature review

One of the most important of the special policies is the Common Agricultural Policy, or CAP (Somai 2014). In its 2014-2020 cycle, the CAP fundamentally changed the system of direct payments, introducing the idea of "greening". With regards to agricultural production, Békés county plays a nationally important role. In 2018, 14,409 producers submitted claims for 438,651 ha of land. This puts the county fourth in the country in terms of number of claimants, and second in terms of total area claimed. The national average for size of ownership in 2018 is 28.29 ha, and in Békés county 30.44 ha, close to the national average. These two preceding figures place Hungary roughly in the middle of the world average with respect to size of land owned (Horváth –Komarek 2016).
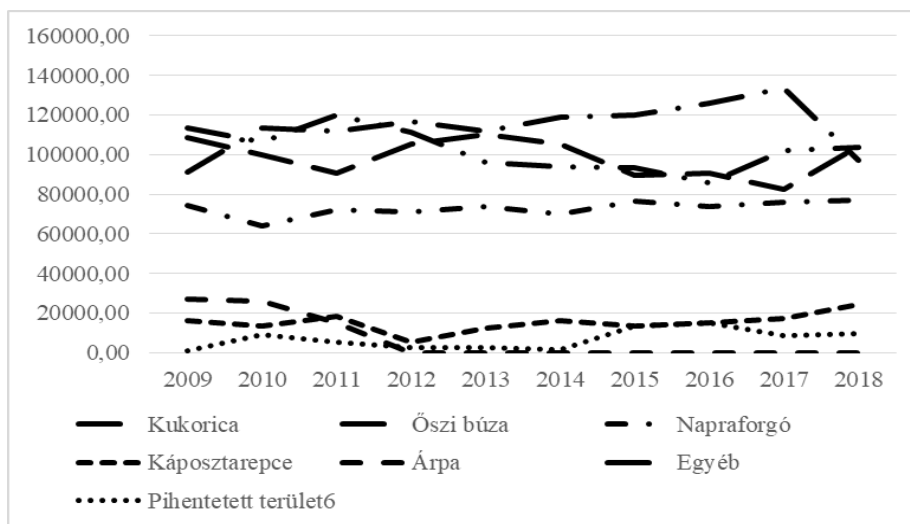


*Figure 1.* The main crops with its sowing area in Békés County 2009-2018 (BMKH 2019)

For data on county-level productive land, I use the data of the Békés County government (Békés Megyei Kormányhivatal, BMKH 2019), (Figure 1.)

From the data in the table, we learn that in terms of crop rotation, five crops account for roughly 60-80% of the arable land use from year to year. We can see that the area in which the main crops were sown has been declining steadily: between 2009 and 2016, the area in which the main crops were grown declined by 10%, roughly 45,000 ha, replaced by other plants. In case of corn, the decline was steady until 2016, and from 2017 began to increase again, surpassing up to 100,000 ha again in 2019. For wheat, the decrease was sharper, reaching its low point in 2017 at around 82,000 ha. In 2019 the area sown with wheat again jumped, totalling over 100,000 ha. The explanation for this, too, lies in the market demand, but agricultural support criteria also played a role. During the period under consideration, producers sowed roughly the same area with sunflower, canola, and barley in the county, though the land devoted to canola jumped in 2018. This also means that the total area devoted to "other" seeds grew continuously from 2009 to 2017. In the later years, the fraction of the land left to rest also increased to several times the area that was left to rest in the first year.

An important element of the European Community's agricultural policy is the idea of letting land rest, via set-aside payments (Divéky 2006). The CAP-reform of 1992 brought substantial changes to rural agricultural development, as did the Agenda2000 reform that followed it. The former introduced mandatory land set-aside (Francsovics 2006). From 2000 on, the CAP emphasized environmental and ecological protection, and rural development, which is reflected in the system of common finances (Rákóczi – Barczi 2015, Veysett et al. 2005). "Greening" was introduced as part of the "Greening" resolution, 10/2015. (III. 13.) FM resolution for climate protection through improved agricultural practice. The resolution requires that all producers with at least 10 ha of land must produce at least 2 kinds of plants, and those with more than 15 ha of land must ensure that 5% of the land meets EFA standards, while those having more than 30 ha of land must produce at least 3 kinds of plants (Hart 2015).

The CAP for budgetary years 2014-2020 set limitations on animals, vegetables grown on arable land, fiber and protein crops, with various levels of support and conditions. The primary goal of the support was to increase the agricultural production, and to reduce the country's dependence on these crops (Rákóczi 2017).

In the course of this research, I attempt to answer the question of whether the latest CAP reforms have resulted in a visible change in the ratio of crops sown in Békés county, and its land use. Orbán (2008) has previously performed similar research trying to find correlations in the 2007–2013 planting cycles.

**Material and methods**

For my data I used the BMKH (Government Office for Békés County) unified county-level survey of land use between 2009 and 2019 in Békés County. I compared the land area of conventional crop plants within each year, as well as year-over-year. I compared this with the land areas of other plants as well, and also compared it with the area of land set aside to rest. I compared the data in Microsoft Excel as percentages of changes from year to year, and also used *time series* analysis to compare the different fractions of land use.

To test my 2nd. hypothesis and to examine the fractions of different areas, I examined the years 2009 through 2019 again as percentages. For the quantity of land set aside to rest, I used the IBM SPSS Statistics 23 statistics program to find Pearson correlation coefficients as part of my analysis.

**Results**

| crops | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | measure of change 2009–2015 %-point |
|---|---|---|---|---|---|---|---|---|---|---|---|
| maize | 26 | 24 | 27 | 25 | 22 | 21 | 21 | 19 | 23 | 23 | -5 |
| wheat | 25 | 23 | 20 | 24 | 25 | 24 | 20 | 20 | 18 | 23 | -5 |
| sunflower | 17 | 14 | 16 | 16 | 17 | 16 | 17 | 16 | 16 | 17 | 0 |
| rape | 3 | 3 | 4 | 1 | 2 | 3 | 3 | 3 | 4 | 5 | 0 |
| barley | 6 | 6 | 3 | 4 | 5 | 6 | 6 | 7 | 5 | 5 | 0 |
| *areas of main crops* | 78 | 71 | 73 | 72 | 73 | 72 | 69 | 67 | 67 | 75 | -9 |
| other crops | 21 | 26 | 25 | 26 | 26 | 27 | 27 | 28 | 30 | 22 | +6 |
| fallow areas | 0,3 | 2 | 1 | 0,6 | 0,5 | 0,4 | 3 | 3 | 2 | 2 | +2,7 |

*Table 1.* The yearly proportion of the crops inside all of the areas
(1) crops, (2) years

Table 1. illustrates the proportion of each plant sown in the given year as a percentage of the total arable land area. The last column shows the size of the change from 2009–2015, and the size of the change from 2009-2018, as percentages. The share of corn grown showed a steady decline all the way until 2016, before beginning to rise again. This same trend was also visible in wheat. Sunflower and rapeseed maintained a more steady share year over year. Although the share of wheat grew, overall the total land it was sown on decreased. When looking through the data in the table, it becomes apparent that in the 2010s, the 5 chief varieties of crops each lost share of the total crop area, while at the same time other plants, and the share of land that was left to rest, grew. One way to see the growing diversification of crops is to notice that the share of the five main crops decreased by 11% through 2017, though it did begin to rise again in 2018. At the same time the percentage of the crop devoted to other plants, or to resting the land, increased, particularly in the last three years. In 2018 the share of land used for these crops surpassed the share from 10 years earlier.

It is apparent that the introduction of "greening" rules led to a substantial reorganization in the land usage devoted to the various crops, since the change was particularly sharp around the year these rules were introduced. At the same time it must be said that 3-4 years after the introduction of these rules, the landowners were able to find ways both to meet the guidelines and fine-tune their crop shares in response to market needs. The quantity of land supported for growing each of the crops is shown in Table 2.

| crops | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| sweet corn | 2 104 | 3 032 | 3 460 | 2 761 | 3 205 | 2 974 | 2 709 | 2 693 | 2 710 | 2802 | |
| sugar pea | 2 090 | 2 531 | 3 127 | 2 130 | 2 328 | 2 920 | 3 893 | 3 594 | 3 269 | 3094 | |
| field pea | 3 639 | 2 562 | 2 802 | 2 656 | 3 307 | 3 270 | 3 567 | 3 741 | 2 366 | 2228 | |
| soya bean | 2 852 | 2 180 | 2 044 | 1 727 | 1 292 | 5 129 | 3 545 | 5 182 | 3 449 | 3182 | |
| w.melon | 2 911 | 2 294 | 1 749 | 1 960 | 2 065 | 1 700 | 1 842 | 1 678 | 1 544 | 337 | |
| sh. melon | 93 | 87 | 85 | 88 | 79 | 85 | 113 | 99 | 76 | 71 | |
| tomato | 667 | 447 | 79 | 293 | 469 | 588 | 523 | 606 | 762 | 683 | |
| alfalfa | 15545 | 15088 | 14141 | 13888 | 14719 | 17051 | 17070 | 18175 | 19521 | 7236 | |

*Table 2.* The area's of supported crops between 2010 and 2019
(1) crops, (2) years

It can also be seen that only certain plants benefited from increased sowing, since from 2010 and 2018 the amount of land devoted to sweet corn grew by 22%, but in the intervening years, the values changed chaotically, and the maximum land devoted to sweet corn was in 2014, at a time when the plant wasn't even supported directly. A similar trend can be observed with dried peas, cantaloupes, and tomatoes. Green peas, soy, and alfalfa definitely saw increased sowing in the year the support was introduced. Nevertheless, the size of land devoted to watermelon shrank in spite of the support, dropping to nearly half its size during the period under examination. We can deduce that the agricultural support for fibrous and protein crops and field vegetable production only partially met its goal. The land data for the main types of plants that receive agricultural support are summarized in table 3.

| type of plantation | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
|---|---|---|---|---|---|---|---|---|---|---|
| apple | 85 | 84 | 88 | 86 | 81 | 78 | 78 | 69 | 87 | 72 |
| nut | 168 | 168 | 170 | 168 | 168 | 169 | 174 | 176 | 203 | 160 |
| almond | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 9 |
| sour cherry | 177 | 180 | 135 | 133 | 134 | 147 | 159 | 159 | 214 | 145 |
| hazel-nut | 61 | 61 | 60 | 61 | 61 | 60 | 60 | 58 | 55 | 44 |
| peach | 27 | 29 | 27 | 30 | 30 | 26 | 26 | 19 | 14 | 9 |
| plum | 191 | 186 | 186 | 181 | 181 | 184 | 187 | 172 | 185 | 135 |

*Table 3.* The area's of supported plantation (%)
(1) crops, (2) years

The land area used for apple production fell by nearly 23% through 2017, while in 2018 it began to grow. The same trend can be seen in the case of sour cherries, with a total of 17%. The land devoted to peaches shrank by 47% and that devoted to plums by 3% between 2010 and 2018. The land area devoted to walnuts and almonds grew, but the area for peanuts decreased. The level of support is relatively high for these plants, but at the same their production does require a certain specialized knowledge, which takes away from farmers' willingness to invest in growing these crops.
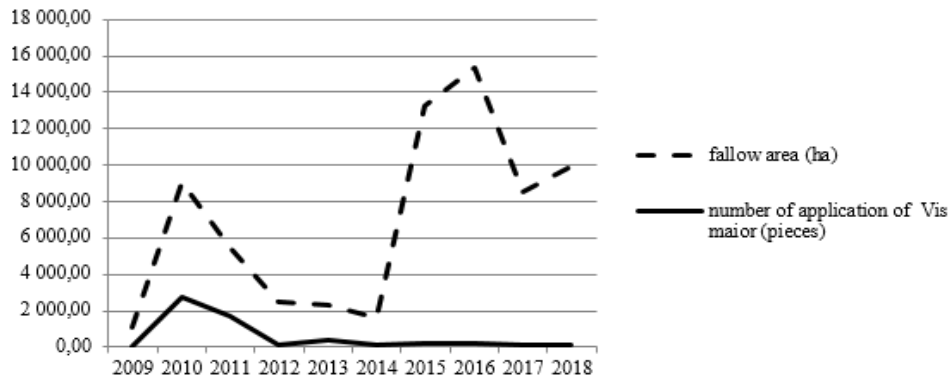
*Figure 2.* The fallow area 2009-2018
(1) area, (2) years

The amount of land set aside to rest in the county clearly grew from 2015 on (figure 2). In 2010 the total size of the land left to rest increased by a factor of about eight, which might be clearly explained by a concurrent period during which groundwater swelled. This interpretation is supported by the sudden increase in the number of vis maior or force majeure claims. In 2010, there were a total of 2,746 vis maior claims for 9,073 ha of set-aside land, which by 2016 grew to more than 15,000 ha. A Pearson correlation analysis showed a significant correlation at the 0.01 level, meaning that from 2009 to 2014 a clear correlation can be shown by the amount of resting land and the number of vis maior claims. The same analysis between the years 2009 and 2016 showed that no correlation can be shown between the land data and the number of claims. In 2018 the amount of land set aside to rest again grew. It can be seen that until 2015, when new CAP rules were introduced, land had been set aside to rest mainly due to weather conditions, but afterward some land was set aside due to the new rules.

The greening regulations introduced by the 2014-2020 support cycle also had a significant impact on the county's land use. In this, the designation of ecological focus areas also ran an arc to mention from 2014 to the present day (Table 4).

| év | 2015 | | 2016 | | 2017 | | 2018 | | 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|
| Ecological Focus Area | application (pc) | area (ha or pc) | application (pc) | area (ha or pc) | application (pc) | area (ha or pc) | application (pc) | area (ha or pc) | application (pc) | area (ha or pc) |
| Waste area | 1794 | 13215 | 1402 | 15334 | 1429 | 8524 | 1490 | 9884 | 1487 | 9551 |
| Terrace | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Trees lane | 143 | 63 | 114 | 67 | 100 | 66 | 92 | 35 | 64 | 29 |
| Alone tree | 14 | 14 | 16 | 18 | 19 | 21 | 18 | 19 | 17 | 17 |
| Avenue | 59 | 11 | 11 | 1 | 8 | 1 | 0 | 0 | 0 | 0 |
| Tree and hedge group | 73 | 14 | 75 | 12 | 65 | 13 | 42 | 9 | 37 | 5 |
| Parcel border | 143 | 88 | 109 | 68 | 84 | 53 | 79 | 35 | 53 | 21 |
| Pond | 48 | 14 | 39 | 12 | 45 | 16 | 43 | 15 | 39 | 11 |
| Watery canal | 169 | 70 | 102 | 50 | 70 | 28 | 0 | 0 | 0 | 0 |
| Mound | 20 | 25 | 15 | 20 | 19 | 24 | 18 | 25 | 18 | 25 |
| Sweep-pol well | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Water protection lane | 2 | 0 | 6 | 0 | 5 | 0 | 7 | 0 | 0 | 0 |
| Water protection pond | 0 | 0 | 3 | 0 | 2 | 0 | 0 | 0 | 0 | 0 |
| Agricultural forest | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Forest lane | 40 | 21 | 27 | 15 | 21 | 8 | 3 | 1 | 0 | 0 |
| Energy plantation | 4 | 14 | 2 | 9 | 1 | 4 | 2 | 7 | 1 | 5 |
| Forested area | 24 | 513 | 15 | 349 | 27 | 573 | 28 | 616 | 32 | 737 |
| Ecological second soving | 1157 | 11384 | 1392 | 15707 | 1265 | 13872 | 1594 | 20854 | 1653 | 23741 |
| Nitrogen-fixing crops | 1784 | 19880 | 1827 | 20773 | 1980 | 23605 | 1380 | 12540 | 1411 | 13255 |

*Table 4.* EFA datas between 2015 and 2019 in Békés County
(1) EFA, (2) years, (3) areas (ha), (4), application (ha, pieces)

In 2015 the area of lands left fallow exceeded even 13 thousand hectares, it reached its peak in 2016 with a quantity of more than 15 thousand hectares. Lands used for growing successive crops of ecological importance tended to be about 11 thousand hectares when the related regulations were launched, and by 2018 more than 20 thousand hectares of land was sowed in the county as a result of a continuous increase. The area of lands with nitrogen-fixing crops has been gradually increasing since 2015, it was approximately 20 thousand hectares. However, there has been a tendency of

decreasing from 2018, which can be caused by breaking the multiannual lands of lucerne as well as planting new fields in smaller quantities.

To reach the mosaic-type of cultivation with agricultural lands, the most significant EFA elements of the greening process are linear and landscape elements. Observing the table, it can be claimed that except for terraces (due to geographical features), water protection lanes and agro-forestry territories, all fields are labelled by people submitting claims for area payments. Nevertheless, it can also be claimed that labelling of these focus areas has continuously decreased throughout the years, people have less and less labelled linear elements in their claims. There has been no decrease in case of so called 'kurgans' (prehistoric burial mounds) although 20-25 pieces of them are labelled by farmers of the total number of 200 pieces registered in the county. Labelling forestry and increasing field EFA element territories is increasing. It can be experienced that – as time goes by – farmers have 'adapted' to the regulations making their claims in accordance with meeting them by selecting the 'more flexible' solution in such a way. Therefore it also resulted in sidelining mosaic-type of land cultivation, which is one of the most important points of greening, into the background and less valuable – but rather significant – EFA elements have been labelled thus regulations are being kept.

## Conclusions

In the county, in the percentage of crops sown, and with respect to crop rotation, a significant restructuring can be observed in agricultural production over the past 10 years. The "greening" rules had and have an effect on the structure of crops grown, and crop diversity increased. Since the introduction of greening (2015), the structural change has been significant, but it seems to have settled down over the past 3-4 years. The agricultural support for plants have only partially succeeded in their goals, and the share of certain plants has grown recently. The first steps of launching regulations for the greening process had significant impacts on county-level biodiversity, however crop structure has regained its original status of the previous years. As regards labelling focus areas, a shifting can be observed towards less 'valuable' field elements.

## Summary

During our research we examined the land using data in the county from 2009 to 2018. We analyzed the statistics from the perspective of area-data and use of land. We determined that in the general crop rotation of the farms, the area of a few main crops was typically decreased and plant diversification in agricultural areas grew, the ratio of set-aside lands significantly increased to the „disadvantage" of cultivars.

Support dependent on plant-based production only caused an increase in cultivated areas in a few cases. It is apparent that the county's cultivation structure has changed greatly in the past nine years in the interest of maximum access to agricultural support via the CAP reforms, however, in the case of certain emphasized crops, the desire to produce has not grown despite production-dependent support.

**Keywords:** common agricultural policy, direct payment, greening, diversification

**Acknowledgement**

**Literature**

BMKH (Békés Megyei Kormányhivatal). (2018): Adatszolgáltatás: A 2018. évi egységes kérelemben feltüntetett országos és megyei területi adatok, igénylés adatok 2009-2018 között.

Divéky-E. A. (2006): A vetőmag kezelési lehetőségei az ökológiai gazdálkodásban. Doktori disszertáció (Budapesti Corvinus Egyetem). 112 p.

Francsovics I. (2006): A mezőgazdasági vállalkozások forrásszerkezetének összefüggései. Doktori disszertáció (Budapesti Corvinus Egyetem).

Hart, K. (2015): Green direct payments: implementation choices of nine Member States and their environmental implications. http://www.eeb.org/index.cfm?LinkServID= 0DFEF8B2-5056-B741-DB05EBEF517EDCCB.

Horváth J. – Komarek L. (2016): A világ mezőgazdaságának fejlődési tendenciái. Szegedi Tudományegyetem Mezőgazdasági Kar, Hódmezővásárhely, 269 p.

Orbán E. (2008): A Közös Agrárpolitika hatása egy árunövény termelő gazdaság vetésszerkezetére. Szakdolgozat (Debreceni Egyetem). 79 p.

Rákóczi A. – Barczi A. (2015): A Körös-Maros Nemzeti Parkért Egyesület kunhalmok védelméért folytatott tevékenységének eredményei 20 év távlatából. Civil Szemle, XII. (2): 57–74.

Rákóczi A. (2017): A „Zöld komponens" első éve Békés megyében. Gazdálkodás 61. (3): 235–246.

Somai M. (2014): Agrártámogatások az Európai Unióban. http://real.mtak.hu/17418/1/Somai_Agr%C3%A1rt%C3%A1mogat%C3%A1sok....pdf

Veysset, P. – Bébin, D. – Lherm, M. (2005): Adaptation to Agenda 2000 (CAP reform) and optimisation of the farming system of French suckler cattle farms in the Charolais area: a model-based study. Agricultural Systems, 83 (2): 179–202.

# APICULTURE SUPPORT PAYMENTS AND THEIR CHARACTERISTICS IN BÉKÉS COUNTY

*Klaudia URBÁN*

Government Office of Békés County, e-mail: urban.klaudia@bekes.gov.hu

## Introduction

Due to its outstanding agricultural conditions, several activities and branches can be found in the agrarian sector in Hungary. Besides the classical branches of plant production, livestock farming and other conventional types of agrarian activities, apiculture with a long-standing tradition is also of particular importance. When looking back into the history of apiculture, from the initial production of beeswax and pastry with honey, we have experienced a large-scale development by nowadays even to bees kept in hives with frames in modern equipment. Apiculture in Hungary is characterised by an excellent natural environment, the diversity of producing conditions and yields and the territorial fragmentation of producers and merchants. As honey production in the world is concerned, Hungary is at the forefront, our exporting activity is covered by roughly three fourths of the honey produced on national level.

The EU support system does have programmes including apiculture as well, however the real significant aid nowadays is provided by national grants and supports. The current year, the field of apiculture receives special attention in Hungary, the year of 2019 has been designated as the year of pollinators. It is targeted to make the apicultural branch competitive and increase health conditions of existing bee census therefore the Ministry of Agriculture has developed a new support construction. Apiaries can receive several non-refundable types of aid or grant within the Hungarian Apicultural National Programme.

## Literature review

Even the Hungarian conquerors knew the basics of apiculture, its significance used to be larger than today because they made fundamental products such as beeswax, pastry and dough made with honey or mead. Production and its 'sales industry' started to decrease in the 18th century because new products such as animal fat, sugar and lighting with oil became popular as well as taxes on apiculture increased. Mátyás, Bél (1729) mentions a beekeeping technology from the 18th century, which used willow twigs formed in a skep (Figure 1.).
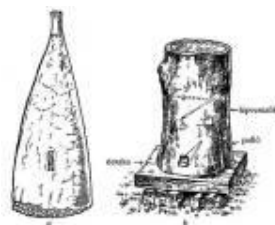


*Figure 1*. 18th century beehives (skeps)

The first professional work on apiculture in Hungarian language, János Gedde's 'Angliai méheskert' (Bee Garden from England) was issued in 1795. From that time onwards, practical and professional workbooks were being published in large numbers, the system of keepers for moving was established, and the first interest representative groups were born as well (Shareholding Association of Beekeepers in Magyaróvár in 1861). The modern hives with a frame and movable panels gave a new basis for apiculture, it had its renaissance all over the world (Nagy 2007).

To provide regulations on the market, the Treaty of Rome signed in Paris on 25th March 1957 declared the introduction of a common politics in the field of agriculture, which covered agriculture as well as commercial activities with agricultural products. The Common Agricultural Policy (CAP) was for a long time the exclusive community politics that directly influenced the situation of rural areas. Its objectives were the followings: to increase agricultural productivity by enhancing technological advancement, rationalising production and using productivity factors, especially labour force, to the greatest extent. Further aims included ensuring proper living standards for farmers, increasing their revenue, stabilising agricultural markets, ensuring food supply and satisfying customer demands. To realise them, according to the Treaty, one or more orientation and warranty fund can be created. The council of EEC made a decision on setting up the European Agricultural Guidance and Guarantee Fund (EAGGF) in 1962 to finance agrarian politics measures. It had two large parts, of which one was linked with market and agricultural supports, the other one focused on restructuring the agrarian system (Hard 2015).

To reach the set aims, the first task was to isolate agricultural market from world market. For that, prices of high profit content were necessary to create, which highly exceeded world market prices. A system of intervention was launched to ensure purchasing unsellable products, extremely high duties were set up on agricultural products to prevent internal market. With the high prices set and stable market conditions, production was given a boost thus resulting in a high-level self-sufficiency in the 70s. Production volumes and farmers' revenue increased, which resulted in compiling large stocks. Simultaneously, another weakness of CAP appeared, which caused problems on international level and contributed to distorting the world market of agricultural products. The system in such a form existed until 1992 when CAP was reviewed and new reforms were launched. During the first reform prices were frozen, quantities were limited and the set-aside schemes were compensated. The demand for a subsequent reform was defined in the Agenda 2000 programme, according to which it would be needed to reduce prices, increase the competitiveness of the agricultural sector, reinforce the European agricultural model built on family farming and award grant and supports in a correct manner. At the period of interim reviewing for CAP, it was demanded to launch new reforms. The uniform farming support system, the application of the compulsory cross-compliance, modulation, financial discipline were introduced, while the second pillar of CAP was reinforced and its market policy pillar was revised. 2 new funds were created on 1st January 2007, the European Agricultural Guarantee Fund (EAGF) and the European Agricultural Fund for Rural Development (EAFRD). The EAGF is aimed at providing finances for market measures, while EAFRD was established to finance rural development programmes (Kiss 2008).

167

In Hungary, agriculture has always been in the focus, almost the entire area of Békés county is cultivated as agricultural lands. One of its branches having products of excellent quality is apiculture. Its primary aim is to manufacture honey and products made from it (propolis, royal jelly, pollen, etc.), while pollination – the inevitable process for agriculture – and sustaining ecological balance are of equal importance (KHS) as well. Our most significant bee pasture is acacia in a territory of an approximately 450 thousand hectares, the second one is sunflower with 600 thousand hectares. As regards both fields, as compared to previous years extremely good results were born in 2017, approximately 25 thousand tons of honey were produced. Nearly two thirds of honey manufactured in Hungary is used as a basic ingredient and transported for export purposes from the country in barrels of 300 kilos, the remaining 7-8 thousand tons of honey is then sold on national level. The largest markets of export are Italy, France and Germany. The low level (0,7 kg/person/year) of consuming honey is in contrast with our production, in which we are major powers. 10% of honey production on EU level is provided by Hungary, and the so called bee population (bee colonies/square kilometres) is the highest in our country not only within the EU but in the world as well (NCA 2017).

According to a study conducted in 2000, there was an average of 46 bee colonies for each beekeeper in Hungary. As compared to the national average, the largest difference tended to be in the southern great plain region including an average size of 58 bee colonies. Although the beekeepers were the largest in number in the northern great plain region, the southern great plain region was the first as regards the size of bee colonies (Nagy 2007).

**Material and methods**

In my research, I am studying apiculture supports. I have made comparative analyses based on the data received from the Government Office of Békés County. When making the analyses, I have compared the data available on claims for supports with the number of apiaries registered. I would like to highlight in what proportion beekeepers in Békés county submit and use claims for supports. Therefore, I have examined the eligible titles for supports, the number of applicants and the grant amounts awarded within the Hungarian Apiculture Programme. I have also touched upon the claims of de minimis aid to be provided for purchasing apiculture related vehicles.

**Results**

In Hungary, traditionally small scale (hobby) apiaries are most widespread, however the proportion of professional apiaries has become 3,6% by today that is 17,2% of Hungary's bee population. As regards the period of 2014-2018, it can be claimed that the number of apiaries having breeding code was the highest in 2015 when 1.367 apiaries were considered as registered ones (Table 1). That number was reducing in the subsequent years; last year it was 1.306 apiaries registered in the system. The number of bee colonies (beehives) tended to increase for the same period until 2016 – showing the highest number of bee colonies with a peak value of 68.303 registered ones – as opposed to the decreasing number of apiaries. According to the latter data, less beekeepers had more bee colonies. In the last 2 years however the number of beehives decreased, which meant 65.834 bee colonies in 2018. A general process of dying and

weather anomalies can cause decrease but the exact reasons for that have not even been identified by experts. It is important to take care of the bee population because bees are essential for Hungarian agriculture as regards pollination.

| Year | Number of bee colonies examined | Number of apiaries having breeding code | Number of persons in charge of examining bee health |
|------|------|------|------|
| 2014 | 62 524 | 1 290 | 59 |
| 2015 | 68 236 | 1 367 | 60 |
| 2016 | 68 303 | 1 356 | 58 |
| 2017 | 67 769 | 1 346 | 60 |
| 2018 | 65 834 | 1 306 | 62 |

*Table 1*. Number of bee colonies in 2014-2018
Source: Government Office of Békés County

The support defined by Regulation 4/2014. (I.27.) issued by the Ministry of Rural Development can be claimed for by beekeepers who operate any vehicle carrying equipment related to beekeeping or a moving beekeeping house during the period of 1st March and 31st October for the current year. Applications can be submitted for grants supporting the purchase of vehicles carrying equipment related to beekeeping or moving beekeeping house and their maintenance. Compared to the year 2014, for the year 2017 the payments doubled. Applicants submitting claims was the highest in number last year with 50 clients, which decreased to 17, more than half the previous amount by 2019 (Table 2).

| 4/2014. (I.27.) Regulation of MRD – De minimis operation support for vehicles of beekeeping | | |
|------|------|------|
| Year | Amount (HUF) | Number of clients (ppl) |
| 2014 | 2 280 214 | 29 |
| 2015 | 4 074 343 | 38 |
| 2016 | 4 675 370 | 44 |
| 2017 | 5 953 092 | 49 |
| 2018 | 5 595 271 | 50 |
| 2019 | 1 819 550 | 17 |

*Table 2*. Tendency of calims for purchasing vehicles of beekeeping between 2014-2019
Source: Government Office of Békés County

The Regulation of 1308/2013/EU of the EU Parliament and Council on creating the common organisation of agricultural markets, and repealing former council regulations of 922/72/EEC, 234/79/EC, 1037/2001/EC and 1234/2007/EC; - provides that member states are allowed to develop national programmes of three years related to apiculture to improve general conditions of manufacturing and selling/marketing products of apiculture.

| National Apiculture Programme (Hungary) | Implementation period of 2017/2018 | | | |
|---|---|---|---|---|
| **Definition of the activity** | **Number of applicants national data (ppl)** | **Awarded grant national data (HUF)** | **Number of applicants Data of Békés county (ppl)** | **Awarded grant Data of Békés county (HUF)** |
| Supporting the visits of demonstration apiaries | 51 | 20 658 122 | 3 | 1 404 482 |
| Supporting the creation and operation of phenological and meteorological bee observation networks | 1 | 4 082 579 | 0 | 0 |
| Supporting the creation of identifying systems for beehives and beekeeping equipment and its maintenance, supporting the operation of the beehive identifying system within provisions and the operators' activity | 11 | 705 056 | 0 | 0 |
| Supporting trainings enhancing the recognition of bee diseases and knowledge transfer on protection | 6 | 1 175 566 | 1 | 207 307 |
| Supporting bee health and environmental impact monitoring examinations | 7 | 26 319 203 | 0 | 0 |
| Supporting the national coordination of apiculture trainings, and the collection and dissemination of bee health studies | 9 | 9 670 689 | 0 | 0 |
| Supporting laboratories analysing apicultural products | 1 | 5 394 735 | 0 | 0 |
| *Supporting the purchase of new equipment for extracting and packing honey and apicultural products and for storing comb* | *1 139* | *122 606 327* | *74* | *9 251 852* |
| Supporting organising works of and participation in a regional event, congress, international event, conference, exhibition, study visits, and the transfer of theoretical knowledge | 396 | 72 492 975 | 13 | 2 324 405 |
| Supporting the operation of the network of professional consultants | 12 | 126 849 040 | 0 | 0 |
| *Supporting the purchase of new equipment and tools for moving bees* | *1 566* | *135 706 926* | *101* | *10 589 582* |
| Supporting alternative protecting measures against varroa mites – purchase of a hygienic bottom planks | 82 | 5 340 782 | 8 | 813 000 |
| Supporting miscellaneous applied research, professional studies and degree works | 1 | 38 000 000 | 0 | 0 |
| *Protection against varroa mites with medicines* | *6 710* | *840 709 546* | *363* | *42 802 678* |
| **Total amount** | **9 992** | **1 409 711 546** | **563** | **67 393 306** |

*Table 3*. Implementation period 2017-2018 of the Hungarian National Apiculture Programme
Source: Government Office of Békés County

Referring to that, Hungary created its own National Apiculture Programme. As regards the period of 2013-2016 it can be claimed that within the programme supports were

used at almost maximum level, it was definitely successful. The opportunities provided by the programme was used in 98,76% in 2013/2014, in 99,51% in 2014/2015 (National Apiculture Programme – Ministry of Agriculture).

According to the *Regulation of 4/2017 (I. 23.)* issued by the *Ministry Agriculture*, which provides rules on using supports run by the central budget within the period of 2016-2019 based on the National Apiculture Programme in co-financing with the European Agricultural Guarantee Fund, each beekeeping farmer (applicant) being a member of the Hungarian National Beekeepers' Association (HNBA) is entitled to claim for support.

The supports mentioned above can be used for the above activities included in Table 2. While examining the three measures attracting the largest interest the followings can be claimed.

The support claimed and used in the largest proportion was 'Protection against varroa mites with medicines', for which 6.710 claims had been submitted that included 363 applications from Békés county. On county level that means an awarded grant amount of 42 million HUF, which covers more than half of the total grants awarded in relation to all the measures. The subsequent popular type of support was 'Supporting the purchase of new equipment and tools for moving bees' with 1.566 claims submitted, which means an awarded grant amount of more than 10 million HUF. The next group of support attracting the largest interest in the third place was 'Supporting the purchase of new equipment for extracting and packing honey and apicultural products and for storing comb' in the period of 2017/2018. In terms of grant amount awarded, it meant more than 9 million HUF for the county. As regards the other measures and actions, supports with more modest amounts were claimed for and paid (Table 3).

### Conclusions

As the supports provided by the National Apiculture Programme in Hungary within the implementation period, it can be claimed on the whole that the supports aroused great interest among beekeepers. The proportion of their claim and use was nearly 100%. However, in the implementation period of 2017/2018, a total rate of 40% of the 1.300 apiaries having breeding code used the supports. Of them, protection against varroa mites with medicines is the most popular type. In terms of support provided for operating vehicles related to beekeeping, it can be said that as compared to the 6 million HUF grant amount paid for the implementation period of 2017 and 2018, this year it has hardly reached 2 million HUF.

### Summary

Honey production in Hungary can again start to flourish due to the intensity of the gradually increasing supporting process. The implementation periods of the National Apiculture Programme in Hungary are definitely considered to be successful with nearly 100% payment ratio to the applicants. Apiaries equipped with the most modern beehives and vehicles are in larger and larger numbers. Bees have great impacts on land cultivation with their pollination activities thus being vital factors of agriculture. The exporting activities of Hungary and the Hungarian acacia honey becoming one of the special products of the Collection of 'Hungaricums' (Hungarian unique values that should be preserved) both indicate that it is a product and branch with an extremely outstanding quality even within the country.

**Keywords:** honey, apiculture, agricultural support, Common Agricultural Policy

**Literature**

Bartos S., Csonka I.(2004) - Acta Agraria Kaposváriensis, - journal.ke.hu

BÉL M. (1729): Békés vármegye leírása (Presentation of Békés County) – Historia Comitatus Békésiensis. In: KRUPA, A. (Szerk.): Békés vármegye leírása (Presentation of Békés County). Gyula: Archive of Békés County, p. 146

BÉMKH (Government Office of Békés County) (2019): Data reporting: Data on apiculture claims for supports for 2017/2018

MINISTRY OF AGRICULTURE – National Apiculture Programme of Hungary (2016)

Hart, K. (2015): Green direct payments: implementation choices of nine Member States and their environmental implications. http://www.eeb.org/index.cfm?LinkServID= 0DFEF8B2-5056-B741-DB05EBEF517EDCCB

KISS KRISZTIÁN (2008) – Vidék, vidékgazdaság, vidékfejlesztés (Rural Areas, Rural Economy, Rural Development) (Knyúr Géza publishing company)

NAGY ISTVÁN (2007): A méhészeti termelés technológiai, gazdasági, társadalmi összefüggéseinek vizsgálata (Doktori PhD értekezés) – Studying the Technological, Economical, Social Correlations of Apiculture Production (PhD thesis)

NAKlap (Hungarian Chamber of Agriculture periodical), December 2017-January 2018 (https://www.nak.hu/tajekoztatasi-szolgaltatas/elelmiszer-feldolgozas/95827-a-hazai-meheszeti-agazat-helyzete)

# LEGAL BACKGROUNDS OF THE UNIQUE LANDSCAPE ELEMENTS IN THE RURAL AREAS

*Anett KRIZSÁN* [1] *– Klaudia URBÁN* [2]

[1] Government Office of Békés County, krizsan.anett@bekes.gov.hu
[2] Government Office of Békés County, urban.klaudia@bekes.gov.hu

## Introduction

’The theme of human culture has always been inspired by the ancient sources of nature, its patterns have been copied from the great forms of everlasting nature. Nevertheless, human culture has been more or less created by the destruction of natural masterpieces everywhere for a long time.’
(Károly, KAÁN,1931)

How can our natural values coexist next to each other yet how can development alongside be ensured? The two of them are in close correlation as development is essentially determined by its circumstances; natural values and their accessibility have always been of utmost importance, in the meantime however the process has resulted in causing damage to natural values.

Human beings of the 21st century cannot let that self-evident process happen, the need for conservation had to be realised and it has also become obvious that legislation would be the most appropriate solution for all that.

Creating the regulations related to the legal protection of natural values does not have a long history, nature and wildlife conservation has a past lasting for hardly more than a century; the demand for revising legal rules as regards nature and wildlife protection emerged in the 1980s, which was especially due to large-scale deforestation and continuous degradation of natural habitats.

## Material and methods

Our research is based on the legislation currently existing in Hungary and paragraphs/articles of the Constitution related to the topic. We have studied the declarations of Law LIII of 1996 on nature and wildlife conservation and publications issued.

## Legal background

Nature and wildlife protection was first regulated on a high-level and overall manner in 1935 with Law IV of 1935 on forest and nature conservation. The first regulation, separate from the forest act, occurred in 1961 in the form of a decree law. Until the Law LIII of 1996 (hereby referred to as NCA – Nature Conservation Act) came into effect, the national-level nature protection had declared exclusively plant and wildlife protection, and marked particular areas as nature reserves.

Nature Conservation Act ceased to continue that tendency, it appoints two major fields: it deals with nature protection in general, and original nature protection by providing a ‘minimum level of protection’ related to all natural values and areas in accordance with the principle of protection.

Natural values and the special protection of land areas is generally via – a separate procedure called – a designation process for protection, with the exception of values and territories that are protected by the law itself, which are called 'ex lege' (by law) protected values, territories.

The codex-type regulation preceding the Nature Conservation Act was established in 1982. [Law 4 of 1982 and its implementing regulation, namely the Cabinet of Ministers Decree 8/1982. (III. 15.)]. That provided the legal background of nature protection in a comprehensive and adequate way at the time of its creation, however regulation based on new rules became relevant by 1996. When creating the law, the legislator found meeting three criteria inevitable.

The first one was to cease to insist on ways of thinking being dominant in the mid-20th century, according to which nature protection equalled with caring of protected nature values. The official justification of the law was not issued, though the person in charge of presenting the draft proposal declared that respecting and sustaining biological diversity would require another attitude, namely protecting nature in its completeness without making any restrictions.

The second criterion was to manage the available natural resources in a way that they would be remained constantly without endangering their abilities for renewal and self-preservation.

The third one was that nature protection would be realised by the entire society based on the principle that in case of conflicting interests the priority of nature protection interest shall be presumed because of meeting the first two criteria.

Constant legal amendments typical of today, the appearance of new codices result in setting up of new bases for legal environments in several fields of life, due to changing conditions and modern world, it is expected from the legislator that all authorities, the jury and each enforcement body shall proceed in a rapid and simple way, yet the principles and expectations of the Nature Conservation Act seem to be durable.

**International outlook**

Nature protection is a relatively new field of international law, the first agreement related to nature protection is dated back to 1886, the new section of nature conservation within international law was created following the drafting of its main principles, which rests on two pillars that are: 'soft law' and international contracts. They can be topics of endless reports and researches therefore not detailed herewith, however they are definitely mentioned (regional, general, sectoral contracts such as Bern Convention, Bonn Convention, UNESCO World Heritage Convention, convention on biological diversity).

EU law as the mandatory standards of member states furthermore cannot be avoided. In the unique 'sui generis' law system of the European Union, nature protection covers a separate branch based on two directives: birds directive (conservation of wild birds – 79/409/EEC) and habitats directive (conservation of natural habitat – 92/43/EEC). As a result of the Bern Convention, the habitats directive created the Natura 2000, a comprehensive ecological network on European level.

The habitats directive in accordance with the international convention on biological diversity 'is the sole international tool created recently, which combines comprehensive nature conservation rules with financial solutions enhancing their implementation thus

providing the opportunity of maintaining particular species and habitats with a complex form of financing.

EU principles cannot be directly and entirely applied in the field of nature protection, it is the duty of national legislation to create the appropriate legal backgrounds, develop the system of regulation and structure, to ensure the priority of prevention tools, not to exclude the tools of responsibility. In case of nature protection, the scope of NCA shall apply mutatis mutandis to the territory of the country including all natural values and areas within that.

'Environment and nature protection do not cover but complete each other forming an organic unit of state and social functions. To maintain completeness, in cases when the current law does not contain declarations other than that, new law regulations of environment protection shall be applied. To accomplish tasks originating from international commitments, the regulations of the current law shall be applied unless the convention defines other rules to meet. Specified principles do not contain direct regulations for law enforcement or application, they rather foster enforcing the interpretation and conception of the regulations of law.' (NCA, General justification). The main principles of the law are the protection of public interest, biological diversity, maintaining natural balance and cooperation.

## Nature protection

The law exhaustively lists the exercises powered by authorities and special authorities to protect natural areas and values in accordance with other procedures defined by special rules of law.

In accordance with international commitments, special protection shall be provided for habitats and areas of land having special values from the aspect of nature protection and for other live organisms due to scientific, cultural or other public interest. It is provided by the process of designating protection.

## Protection of 'kurgans' (prehistoric burial mounds)

Natural values requiring further protection from a particular aspect shall be designated as 'specially protected' ones and protected accordingly. Such types of phenomena are the so called 'kurgans', which are artificially created prehistoric mounds often with burial purpose.

According to paragraph 22 of NCA, natural values shall be designated as 'protected' ones for providing special protection from scientific, cultural, aesthetic, educational, economical and other public interests, and to preserve biological diversity, which are listed in 11 points by the legislator.

Mounds are to be considered as protected items by law; that rule was raised on legal level as a law in 1994 as a result of a professional event held in Békés county.

When studying 20th century legal environment, it can be claimed that 'mound' protection was already provided even by a museum law issued in 1963. According to the textual part of the legislative decree No. 9 of 1963, including all amendments and supplements as well:

'The special artefacts, written and other records of nature and society that are irreplaceable, typical proofs of nature evolution and society development shall be protected in a particular way, preserved for national and universal culture, studied and

processed in a scientific manner and made accessible defined in the current legislative decree. The scope of the legislative decree also covers areas of land with historical and archaeological importance.' According to the decree, the (archaeological) sites and areas of historical importance in the country shall be protected. The process of designated protection is – based on the Hungarian National Museum – ordered by the minister of culture. Designated protection of (archaeological) lands of historical importance, and the termination of protection are both required to be included in the land registry, the procedure for that is defined by the minister of culture.

The process of designated protection and registration were integral parts of the legal system even in 1963. It is the separate duty of each state to explore, identify, preserve and provide legal protection to its historical and natural values. Article P) of Hungary's Constitution declares the state's liabilities providing the basis for such duties: natural resources, especially fields of arable land, forests and water supply, biological diversity, especially native flora and fauna, and cultural values are common heritage of a nation, whose protection, maintenance and preservation for the future generations are the duty of the state and its people.

'Kurgans' have been designated as protected natural areas since NCA entered into force, the notion of 'kurgan' itself however was defined only in 2003 when the act was amended. It is a question of clarification to what extent the definition is accurate and adequate with the results of researches, as recent enquiries implemented in the last 15 years can result in making the legal definition more clear and complete.

## Literature

Természetvédelmi jogi ismeretek (LEGAL STUDIES ON NATURE PROTECTION): Dr. Csepregi István, renewed by Schmidt András, completed by Czirák Zoltán, Greguss Ditta, Kőrösi Levente, Nagy János, Práger Anna and Sashalmi Éva

A természetvédelem nemzetközi és Európai Unió-beli jogi rendszere (2002) (LEGAL SYSTEM OF NATURE PROTECTION ON NATIONAL AND EU LEVELS 2002): dr. Kert Ágota, WWF Hungary Publishing Company, Budapest

A kunhalmok védelme és megmentésük lehetőségei (1998) (THE PROTECTION OF KURGANS AND OPPORTUNITIES FOR THEIR PRESERVATION 1998): Kiss Csaba, Kisújszállás, DATE-MVFK Publishing Company, Szarvas

Rules of law referred to:

Constitution of Hungary (2011)

Law LIII of 1996: Nature Conservation Act

# TRADE OF AGRICULTURAL LAND IN BÉKÉS COUNTY

*Károly BODNÁR* [1] *– Zoltán István PRIVÓCZKI* [2]

[1] Szent István University, Faculty of Agricultural and Economic Studies, 5540 Szarvas, Szabadság u. 1-3.
e-mail: bodnarkaroly.dr@gmail.com
[2] AGRO-ASSISTANCE Kft., 6640 Csongrád, Erzsébet u. 20., e-mail: agrarpalyazat@gmail.com

## Introduction

In 2018, agricultural land prices continued to grow at a rate higher than in the previous year. Prices for agricultural and forestry land were on average 11% higher than a year earlier. The average price of arable land, the most significant cultivation branch, was 1,486,700 HUF per hectare. The land sold amounted to 72,000 hectares, almost the same as last year's sales, and one third of the extraordinary land sales two years earlier.

The county average is determined by the evolution of prices of land sold in the current year prices. As in the regions, there are large price differences between counties and within counties. In 2018, the average arable land prices increased in Somogy (21%), Hajdú-Bihar (19%) and Baranya (16%) counties by more than 15%, while in Heves, Komárom and Pest counties decreased slightly (2.9, 4.9, and 6.9% respectively). Combined changes in arable sales volume and prices resulted in an 11% higher sales value in 2018 than in the previous year. Most of the value of arable land was generated in Békés county (14%), followed by Hajdú-Bihar (13%) and Bács-Kiskun county (9.3%).

## Literature review

In the formulation of the Constitutional Court's decision (35/1994. (VI. 24.)), land ownership has specific natural and property characteristics, i.e. the land is a finite good - as a natural object, and land is available to a limited extent and cannot be reproduced. Their indispensability, renewable capacity, special risk sensitivity and low profitability embody the particular social attachment of land ownership (Horváth, 2017).

It can also be stated that its purpose is also given, i.e. mainly agricultural activity. Thus, land management cannot function in such a way that legislation ensures unrestricted ownership for everyone, but is a necessary constraint on private ownership in the sense that it can be restricted by both private and public law. This connection can also be found in some European national constitutions (Hornyák, 2017).

It can be stated that the national economic role of the agricultural sector in Hungary is still significant despite the significant downturn. This is mainly due to the much better-than-average characteristics of agricultural production, which is also present as part of the rural way of life, production traditions and the sector's rates well above the EU average (due to the proportion of utilized agricultural area and number of persons engaged in agricultural activities) (Harsányi et al., 2014).

The value of land ownership is significant, which is further increased by EU funds, in particular area payments (Kovách, 2018). The amount of subsidies paid and the income of the sector have increased significantly since EU accession. In the future, competitiveness will be replaced by subsidies, which is a more serious task than fighting and maintaining subsidies. The phasing-out of support is expected mainly in the

area of direct payments. At the same time, there is a strong correlation between increases in land rents and increasing direct subsidies (Popp et al., 2017).

The proportion of arable land in the region is the highest in Békés county (72.4%), but also in Csongrád (58.2%). Grasslands are significant in Bács-Kiskun County, and the proportion of vineyards is the highest in this county. The rate of forest cover in this county is also relatively high (19.7%), while in Békés it is the lowest in the country (2.3%). Overall, the average quality of arable land is the best on the Békés Plain and the Békés Plateau (in many settlements it exceeds 40 AK per hectare). In Békés County only Geszt, Biharugra and Szabadkígyós have less than 50% arable land (Duray, 2011).

In terms of agricultural production, Mezőhegyes has good facilities. Its territory is dominated by different types of chernozem soils. The meadow chernozem and the lowland calcareous chernozem provide an excellent basis for arable crop production (37.82 AK) (Zsótér, 2010).

The sale and purchase of agricultural and forestry land since May 2014 is a highly complex, multi-actor process that takes at least 6 months (not counting any appeal procedure) (Balogh, 2019). Originally, the Land Transaction Act was intended to provide local land committees with an opinion on land purchases based on local considerations and knowledge. Given that these have not been established, their role has been performed by NAK regional bodies since 2014 with the participation of more than 12,000 local farmers, commenting on 50-70,000 agricultural land sales and purchases per year.

## Material and methods

Our work was based on preliminary discussions with stakeholders, following a preliminary study of the literature and the data of Central Statistical Office. During the preparation of a doctoral dissertation, we summarized the experience of interviewing a number of agricultural entrepreneurs, young farmers and some professionals working in the area.

## Results

According to the data of the Central Statistical Office (1. June 2019), the production area of Hungary is 59 percent of arable land (4317 thousand hectares), 26.5 percent of forest, that is 1939 thousand hectares, 10.8 percent of grassland (790 thousand hectares), 1.3 percent of grapes, 0.5 percent vegetable garden, 0.5 percent fish pond and 0.5 percent reed.

80-85% of the country's territory is covered by agricultural land, and the size of land per capita is among the highest in the European countries, thus it can be stated that agricultural land is an extremely important natural resource in Hungary. Due to the favourable natural conditions, the proportion of good quality soils is good and the soils with high fertility are significant, but we cannot ignore the fact that the proportion of production areas has been constantly decreasing, mainly due to the expansion of infrastructure and settlements agricultural practices and land use, which ignore natural conditions, have deteriorated.

Soil is still one of our greatest natural assets, and this is especially true in our county, where it has high quality areas.

The most expensive land was is Békés County in 2017 (Figure 1). The average price of arable land was 1.243 million HUF nationally and 1,594,806 HUF in Békés. Mezőkovácsháza (2.136 million HUF) and Békéscsaba (2.034 million HUF) average prices are more than two million forints. The database used to calculate the average arable land prices included a sales price of a total of 67,222 hectares of arable land, representing about 70 percent of the arable land under investigation. Almost 43 percent of the national arable land traffic was in the Northern and Southern Great Plain.
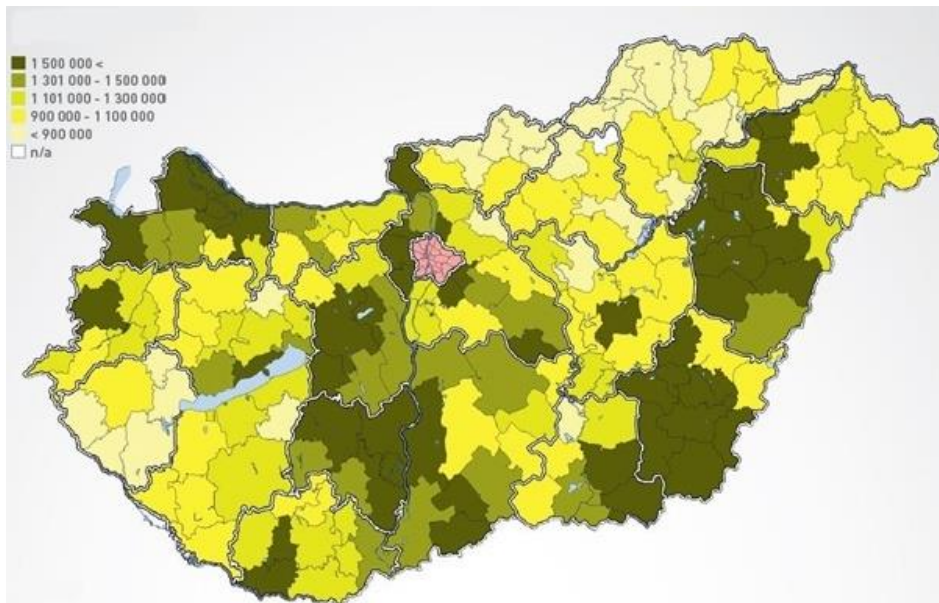


*Figure 1.* Average land price in districts (2017, HUF/ha)
Source: OTP (2018)

The slow rise in land prices continued last year in our county. In Békéscsaba, they asked for and sold an average of 3 million HUF per hectare, with a 65 thousand HUF/AK. The same data were in Gyomaendrőd: 1.9 million HUF/ha (67 thousand HUF/AK), 2.5 million HUF/ha in Orosháza (68 thousand HUF/AK), 2.8 million HUF/ha in Mezőkovácsháza (69 thousand HUF/AK), in Szeghalom 1 million HUF /ha, (63 thousand HUF/AK).
Last year, land prices increased by 19 percent compared to previous years, so the national average price per hectare is around 1.6 million HUF, The highest price increase was recorded in the Southern Great Plain region, where the average price per hectare was 1.8 million HUF (Figure 2).
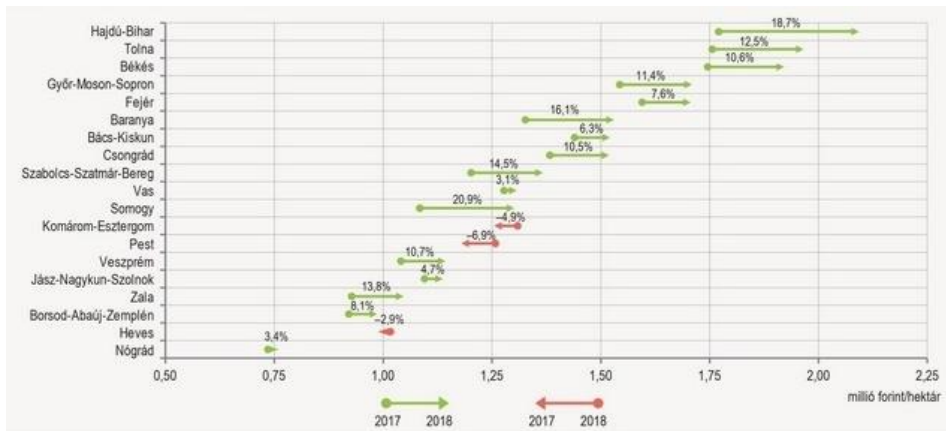
*Figure 2*. Changing of the average land price in the Hungarian counties
Source: KSH (2019)

In 2018, the annual rent for arable land was up 6.5% on average after an increase of 5.8% in the previous year, resulting in an average annual rent of one hectare of land was 55,700 HUF nationwide. The rate of own property is on Figure 3. The annual rent for one hectare of arable land was 3.7% of the purchase price in 2018. This rate has been steadily declining since 2010 as the price rises more than rent. At county level, the proportion of arable land rents to the price in 2018 was between 3.1% and 5.2%.
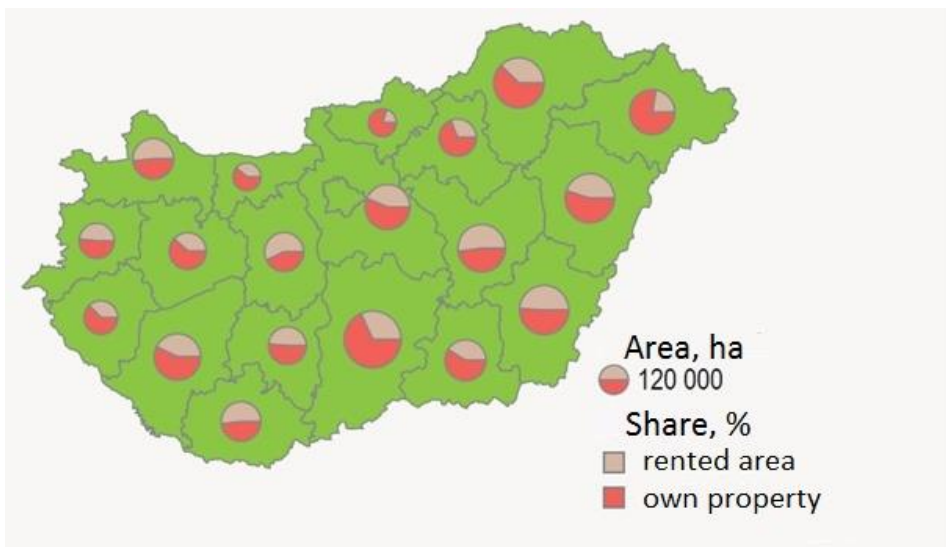


*Figure 3*. Distribution of land by property
Source: KSH (2019)

## Conclusions

With regard to the distribution of areas sold by cultivation in each county arable land was dominant, of which Békés County sold the most (5,700 hectares). Overall, more than half of the arable land sales were realized in the Great Plain counties.

The average price of arable land was the highest in the Southern Great Plain, 1.7 million HUF/ha, but with the exception of Northern Hungary and the Pest region, it was close to or reached 1.5 million HUF/ha. There are significant price differences within each region, depending on land quality and other factors. (In the same region, the price per hectare of a good quality land area can be double that of a low quality one.) The average arable land sales price in 2018 was the highest in Hajdú-Bihar, Tolna and Békés counties.

## Summary

Békés County is located in South-East Hungary. The area is plain, the average quality of the soil is higher than the national average, the number of sunny hours is high and the area theoretically has surface waters suitable for irrigation thanks to the Körös rivers. Thanks to favourable ecological conditions, the average price of land is one of the highest in the country there are also prices above 3 million HUF/ha (average: 1.77 million HUF/ha). Despite the price, there is a relatively high demand for arable land but little for sale. Partly because of the high price and partly due to the rules of pre-emption, access to land for new entrant young farmers seems to be more difficult than average.

**Keywords:** arable land, land trade, land price, Békés County

## Literature

BALOGH B. (2019): Változások a földforgalmi szabályozásban. Tájékoztató Kiadvány 1., NAK, Budapest

DURAY B. (2011): Várható tájhasználati hatások a Dél-Alföldön. In: Rakonczai J. (szerk.) (2011): Környezeti változások Békéscsaba, Magyarország, Nagyalföld Alapítvány 181-188.

HARSÁNYI E. – FEJÉR P. I. – KUTASINÉ NAGY I. – RÁTONYI T. (2014): A vidékiség értelmezése és a földhasználat helyzete Magyarországon. Agrártudományi Közlemények, 61, 79-85.

HORNYÁK ZS. (2017): A mezőgazdasági föld mint természeti erőforrás. Pro Publico Bono – Magyar Közigazgatás, 4, 188-204.

HORVÁTH G. (2017): Az élet természeti alapjainak védelmi rendszerei és az agrárgazdaság. In: szerk. Gellén Klára: Honori et virtuti. Ünnepi tanulmányok Bobvos Pál 65. születésnapjára, Iurisperitus Kiadó, Szeged, 2017, 168.

KOVÁCH I. (2018): Földhasználat és földtulajdon-szerkezet. In: Kolosi és Tóth: Társadalmi riport 2018. TÁRKI, Budapest, 248-263.

KSH (2019): www.ksh.hu (letöltés: 2019. augusztus 16.)

OTP (2018): OTP termőföld értéktérkép. OTP jelzálogbank, www.otpjzb.hu (letöltés: 2018. 06. 20.)

POPP J. – HOLLÓSI D. – FAZAKAS P. – OLÁH J. (2017): A versenyképes mezőgazdaság, a földár és a föld jövedelemtermelő képességének összefüggései. Gazdálkodás, 61:6, 491-504.

ZSÓTÉR B. (2010): Mezőhegyes – egy sajátos település útja az Alföldön. PhD értekezés, Pécsi Tudományegyetem TTK Földtudományok Doktori Iskola, Pécs

# REGIONAL DIFFERENCES OF EXTRA-CULLICULAR ADULT EDUCATION BY COUNTIES OF HUNGARY

*Gábor KONCZ* [1] *– Dávid HAJDÚ* [2]

[1] Eszterházy Károly University Faculty of Agricultural Sciences and Rural Development, 36. Mátrai str. Gyöngyös H-3200, e-mail: koncz.gabor@uni-eszterhazy.hu
[2] Szent István University Enyedi György Doctoral School of Regional Sciences, 1. Páter Károly str. Gödöllő H-2100, e-mail: hajdu.david91@gmail.com

## Introduction

The emergence of a new consumer-service society has significantly increased the role of human resources over natural resources. In a knowledge-based economy, this can make a region competitive (Erdei–Teperics 2014). Knowledge, experience, expertise is a form of capital, part of organizational wealth, a strategic resource (Krisztián 2004). It is expensive to develop and operate and requires significant investments from the individual, the state and the economy (Benke 2005). An important function of training is the enforcement of employment policy, promotion of employment and employability (Pallós 2006). An important factor in expanding employment is ensuring a supply of labour that is geared to investor needs. A key role here is non-formal adult education, which is able to respond quickly to emerging needs (Köpeczi-Bócz 2005).

## Literature review

Education and training can be part of the solution to many economic and social problems. Adult education can be categorized into general, regular and professional groups (Koltai 2003). Adult education provides an opportunity to eliminate social disadvantages, to shift social mobility and to follow the labour market needs of the economy, to meet the constantly emerging economic and social needs and to acquire new competences (Mócz 2013). Most of the positive effects are only sustained over the long term (e.g. integration of disadvantaged social groups), but there are times when rapid and focused intervention is needed (Nyilas 2016). Providing the labour supply for large investments is the most difficult task, as it usually requires a larger number of specially trained workers in a given area within a short period of time. In a favourable situation, having the knowledge of information and needs, the schools of the region can prepare in due time and train the appropriate number of students. However, this requires 3-4 years, but adult education can do it in much shorter time (Soós 2007).

Following the accession of Hungary to the European Union, a government strategy was developed to spread and deepen the concept of lifelong learning. The aim of the government was that – in addition to catching up –, the subsidized trainings, based on the needs of the employer, would serve as early employment and further employment. To achieve this, the supply of training to the unemployed and other inactive people of working age needs to be increased, as well as their support and interest in training (Taródi Cseszka 2018).

Today, adult education and the world of work are facing new challenges. Population loss, an aging society, an atomizing family structure, advances in computing,

globalization of work, and the impact of migration are placing new demands on individuals and the state as the labour market seek professionals (Makkos 2018).

Adult education is planned through a wide-ranging social partnership, within the framework of the Annual Free Education Model Plans, at national, regional and local levels. In the development of the competences of the regional levels (micro-region, region) it can be seen that the county and the districts are the territorial units where the settlement and micro-regional tasks are transparent and performable, therefore the county has a strong professional role in the free education model (Baka 2003).

The role of counties with different economic characteristics and labour market situations is also different in adult education. According to a study is 2013 the language trainings were the most popular in the country and in most counties (except: Békés, Somogy and Vas) with share of 30-40%. In the majority of the counties, professional, non-accredited trainings were ranked second based on the nature of the training. Their share within the training structure was generally between 20 and 30 percent. It was a peculiarity of Győr-Moson-Sopron County that the proportion of this category exceeded 80%. Accredited (OKJ) trainings proved to be the third most popular in 12 counties with a share of 10-20% (Varga 2014).

### Material and methods

After reviewing the relevant literature, in our research we examined the regional differences in the significance and structure of adult education. The territorial framework of the study was provided by the Hungarian counties and Budapest. Our analysis was based on secondary databases, which we downloaded from the OSAP 1665 statistical interface (https://statisztika.mer.gov.hu/) web site according to our research questions. Territorial comparisons were made based on the number of students enrolled in the trainings. Following the absolute and relative numbers of participants in the training, they examine their composition on the basis of gender, age, highest educational level of participants; nature, type and form of training and categories of unified job classification system.

### Results

Since the accession of Hungary to the European Union, the number of citizens participating in adult education has increased many times over (Figure 1). The expansion of the sector was not uninterrupted, with two significant declines following the initial stagnation (2012 and 2015-2016).

According to the 2018 data supply, the number of students enrolled in training courses in Hungary was 892,312. 38.3% of this population was concentrated in the capital, followed by the most populous counties of Eastern Hungary, including extensive peripheral areas (Borsod-Abaúj-Zemplén – 8.5%, Szabolcs-Szatmár-Bereg – 7.7%). The lowest participation rates were in small, rural counties of the country, such as Nógrád, Tolna and Zala (Table 1).

According to the gender distribution of the trainees, women show a 15% majority of men in the country. However, some highly industrialized counties are characterized by a significant male surplus. In addition to their increased interest, women's generalized surplus is also due to having children. Women leave the labour market after childbirth

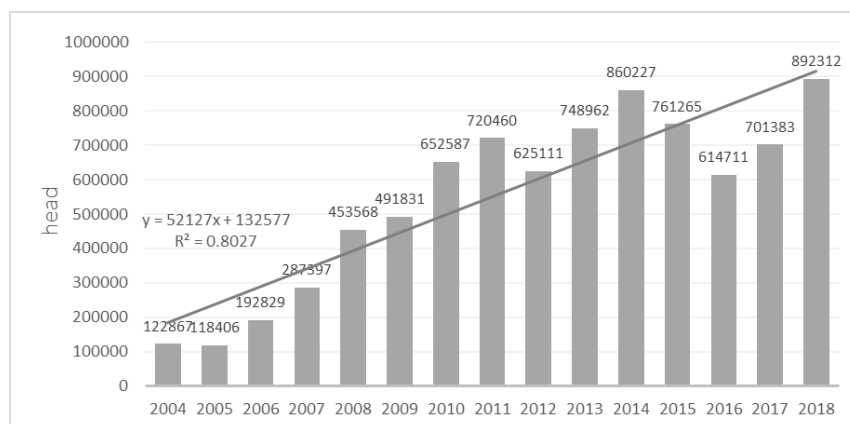for 3 years, during that time there is so much change in their workplace that it is not easy to get back on track.



*Figure 1.* Trends in enrollment of students in adult education programs between 2004 and 2018
Source: OSAP 1665 statistical interface (https://statisztika.mer.gov.hu/)

| Ranking | Counties | Share (%) | Ranking | Counties | Share (%) |
|---|---|---|---|---|---|
| *1.* | Budapest | 38.33 | *11.* | Jász-Nagykun-Szolnok | 2.62 |
| *2.* | Borsod-Abaúj-Zemplén | 8.53 | *12.* | Somogy | 2.18 |
| *3.* | Szabolcs-Szatmár-Bereg | 7.76 | *13.* | Békés | 2.16 |
| *4.* | Győr-Moson-Sopron | 5.05 | *14.* | Vas | 2.07 |
| *5.* | Hajdú-Bihar | 4.98 | *15.* | Veszprém | 2.02 |
| *6.* | Baranya | 3.44 | *16.* | Heves | 1.98 |
| *7.* | Pest | 3.42 | *17.* | Komárom-Esztergom | 1.83 |
| *8.* | Bács-Kiskun | 3.21 | *18.* | Tolna | 1.49 |
| *9.* | Csongrád | 3.21 | *19.* | Zala | 1.45 |
| *10.* | Fejér | 2.91 | *20.* | Nógrád | 1.34 |

*Table 1.* Territorial concentration of adult education in the counties of Hungary (including Budapest), 2018
Source: OSAP 1665 statistical interface (https://statisztika.mer.gov.hu/).

The age distribution of the examined population in each county is similar to the normal distribution, i.e. it shows the majority of middle-aged people. However, in some regions (e.g. Budapest) the prevalence of people aged 35-50 years is high, while in some less developed counties the presence of people aged 20-60 years is almost even.
The database divides the highest level of education of the trainees into 14 categories. In the present study, only the highest and lowest categories are discussed in detail. The proportion of people with a diploma obtained in a higher education institution was 23.2% nationwide in 2018. Not surprisingly, the highest rate was observed in Budapest, where it exceeded 30%. The capital was followed by Heves (28.5%), Veszprém (26.4%) and Zala (25.1%) counties, which can be attributed to the increased presence of graduate unemployed. The proportion of graduates did not even reach 15% in Nógrád (13%), Szabolcs-Szatmár-Bereg (14.8%) and Baranya (14.9%) counties. The other

extreme category is those who have not completed eight grades of primary school. Their share in the capital and six other counties is less than one percent. The national average is close to 2%. In this respect, Borsod-Abaúj-Zemplén County has an extremely high value, almost double that of the successive counties.

Of course, we examined not only the absolute number of students, but also the relative indicator per thousand inhabitants. This statement only confirms the outstanding importance of Budapest in adult education and points out its negative impact on the situation of Pest County. Counties with regional centres and significant training networks are also in the first half of the list. With the exception of the two extreme values mentioned above, the majority of Hungarian counties form a strong mid-field based on this indicator. However, three counties should be highlighted. Szabolcs-Szatmár-Bereg and Borsod-Abaúj-Zemplén counties are at the top of the list due to the unfavourable composition of their human resources and the lower number of job opportunities. In the case of Győr-Moson-Sopron County, the opposite situation is true, where the changing needs of employers are more evident, which encourages employees to continue their education while working (Figure 2).
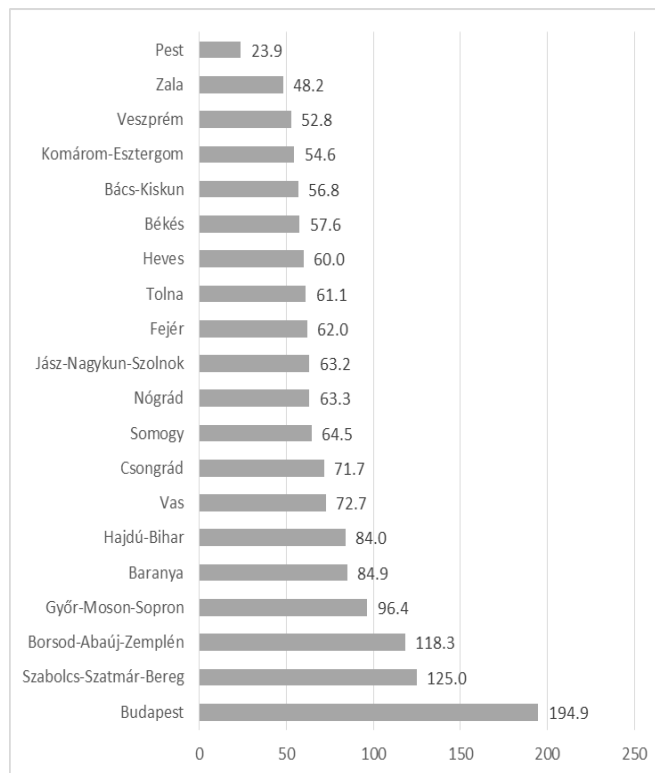


*Figure 2*. The number of adult people enrolled in trainings per 1000 inhabitants (2018)
Source: OSAP 1665 statistical interface (https://statisztika.mer.gov.hu/) & Hungarian Central Ststistical Office (2018).

185

In terms of the nature of the trainings, based on the number of adult learners the general adult education has the highest importance. It is followed by professional trainings and then accredited vocational trainings (OKJ). In many cases, the additional categories are related to specialized fields. However, it is also worth highlighting IT training courses, which totaled more than 127,000 people. The form of the training was 85.5% group training, 13.2% distance education (most of which was related to Budapest) and 1.3% individual training.

We examined the distribution among categories of the Hungarian unified job classification system. In this regard, we cannot collect meaningful information from 60% of the participants in the database. The forklift driver was the most popular qualification in Hungary, with 36,429 people, which ranked first in 13 counties. In Budapest and in five counties, finance and accounting jobs have come first, such as auditors, accountants and heads of their units. Only in Nógrád County was the truck driver the most popular profession.

## Conclusions

The importance of adult education has grown significantly across the country in the last one and a half decades, which has strengthened the range of businesses specializing in adult education. Budapest also constitutes a separate category in adult education and offers a huge choice for its highly educated population, the role of towns in the agglomeration is dwarfed by it. The announcement of training for a number of specialized professions is clearly linked to major cities, reinforcing the relative concentration of trainings. The role of adult education in the labour market and catching up is significant, but there is a marked difference in their territorial distribution. The training structure of the more industrialized counties is also apparent from the other parameters (gender, age) of the participants in the trainings. The catching-up training courses are clearly linked to the periphery of the country, but in connection with the importance of this problem, the situation of Borsod-Abaúj-Zemplén county has to be emphasized. The geographical distribution of know-how that can be put to good use in the market is almost the opposite.

## Summary

In order to meet the changing needs of the labour market and to be successful in the world of work, adult education and training are strongly needed. Today, the state, employers and employees alike have become interested in the availability of adult education. Apart from the spread of the concept of lifelong learning, there are concrete practical reasons for this. Although the supply of jobs is relatively high, workers need to be trained to take on new responsibilities. The geographical availability of trainings is a major problem only in the case of more specialized fields and further trainings. However, some of them can also be taught in distance education. In popular trades, groups are formed in each county. Another important group of adult training courses is catching up training, which can be organized locally in disadvantaged areas due to the significant number of people involved. This is very likely to be necessary, as they have the lowest willingness to commute.

**Keywords:** adult education, catch-up trainings, regional inequalities, advanced studies, employment

## Literature

BAKA J. (2011): A felnőttképzés területi alapú innovációja. = Tudásmenedzsment: A Pécsi Tudományegyetem Bölcsészettudományi Kar Humán Fejlesztési és Kultúratudományi Intézet periodikája 12(1), pp. 24-29.

BENKE M. (2005): A regionális és az ágazati tervezés kapcsolata a hátrányos helyzetű térségekben. Zárótanulmány. NFI, Budapest, 129 p.

ERDEI G.–TEPERICS K. (2014): Adult learning activities as the catalyst for creating learning region. = Procedia - Social and Behavioral Sciences 142, pp. 359-366.

KOLTAI D. (2003): A felnőttképzés elméleti, gazdasági és területi problémái. PTE, Pécs, 234 p.

KÖPECZI-BÓCZ T. (2005): Kutatás a felnőttoktatás és képzés nemzetközi cél- és feladatrendszerének változásáról a korszerű piacgazdaság, illetve a tanuló társadalom fejlődésének tükrében. NFI, Budapest, 92 p.

KRISZTIÁN B. (2004): Az Európai térség és a felnőttképzés. = Felnőttképzés 2(2), pp. 22-25.

MAKKOS N. (2018): Felnőttképzés, esélyegyenlőség, közigazgatás. = Jogelméleti Szemle 2018/1., pp. 109-117.

MÓCZ D. (2013): Az élethosszig tartó tanulás gazdasági szerepe. In: Karlovitz, J. T. (szerk.) Ekonomické štúdie - teória a prax (Gazdasági tanulmányok - elmélet és gyakorlat). International Research Institute, Komárno, Szlovákia, pp. 658-664.

NYILAS O. (2016): Hátrányos helyzetű társadalmi csoportok és a felnőttképzés: esély az integrációra? = Educatio 25(3), pp. 451-458.

PALLÓS J. (2006): A befektetői igényekhez igazodó képzési programok, a beruházás-, munkahelyteremtés-ösztönző, továbbá a gazdasági szerkezetváltást, technológiaváltást, a foglalkoztatási válsághelyzet megoldását célzó képzési pályázati programok elemzése. Kutatási zárótanulmány. Felnőttképzési Kutatási Füzetek 2006/15., 189 p.

SOÓS A. (2007): Az állami szerepvállalás a foglalkoztatási célú képzésekben. In: Zachár L. (szerk.) Tanártovábbképzési konferenciák, 2007. NSZFI, Budapest, pp. 50-67.

TARÓDI CSESZKA É. (2018): Versenyképesség, emberi tőkeberuházás, élethosszig tartó tanulás: a felnőttoktatás és a felnőttképzés szerepe a sikeres munkaerőpiaci kompetenciák kialakításában. Közelítések 5(3-4), pp. 21-33.

VARGA L. (2014): A felnőttképzés területi különbségei 2013-ban. = Szak- és felnőttképzés 3(5-6), pp. 23-25.

# CHARACTERISTICS OF ADULT EDUCATION IN HUNGARY COMPARED TO THE EUROPEAN UNION

*Dávid HAJDÚ* [1] *– Gábor KONCZ* [2]

[1] Szent István University Enyedi György Doctoral School of Regional Sciences, 1. Páter Károly str. Gödöllő H-2100, e-mail: hajdu.david91@gmail.com
[2] Eszterházy Károly University Faculty of Agricultural Sciences and Rural Development, 36. Mátrai str. Gyöngyös H-3200, e-mail: koncz.gabor@uni-eszterhazy.hu

## Introduction

The Council of the European Union adopted a resolution on lifelong learning on 27 June 2002. According to the Council, education and training are an essential tool for promoting social cohesion, active citizenship, personal and professional development, and employability. Lifelong learning contributes to the goals and aspirations of the EU countries – i.e. prosperity, competitiveness, tolerance and democracy (Csoma 2005). The document was closely linked to the objectives set out in the Lisbon Strategy to make the European Union the most competitive and dynamic knowledge-based society in the world. To do this, traditional systems of education and training need to be reshaped: they must respond to the needs of the learning citizen through more open, flexible systems, offering them a chance throughout their lives (Varga 2006). The introduction of the new tools offered Hungary the opportunity to catch up with the more advanced member states after 2004. Knowledge has become a new and decisive resource for regional development (Rechnitzer 2008).

## Literature review

Like the European Union, adult education is a high priority for the OECD. As early as the 1960s, the organization embraced the topic of continuous learning, which currently serves mainly conceptual and country studies (Jánossy et al. 2009). Adult education strategy is based on the recognition that one cannot be satisfied with pre-employment education. Lifelong learning is the key to both employment and full social inclusion (Csoba 2010).

The economic goal of adult education is to increase the population's access to the competences needed for more and better jobs and to keep them up-to-date in the context of lifelong learning (Brandt 2015). In the knowledge society of the future, the so-called knowledge triangle (education, research and innovation) has a key role to play in achieving employment and growth objectives, with particular reference to the interplay between the three elements. Adult education can be one of the usefully "unproductive" public spending goals that can help cool an overheated economy that is growing at an unsustainable pace and structure over a longer period of time, while improving the competitiveness of the economy (Csoba 2010).

Both the literature and international examples show that adult learning is not just an economic, job-preservation issue. It has a broader scope: it has an impact on social equal opportunities, cultural integration and personal development. For a variety of reasons (early school leavers, immigrants, etc.), those who are lagging behind in their abilities and skills may be excluded from society as a whole (Fouarge et al. 2012). Adult

education can be an antidote to the exclusion spiral, i.e. it can be a tool for social inclusion. An effective adult education program can have a positive impact not only on well-being and employment indicators, but also on physical and mental health. Among the three types of adult learning – formal, non-formal and informal – the latter can open up to wider social groups (Bajusz 2015).

Despite the great diversity of the 28 countries of the European Union, studies of contemporary processes in adult education have shown that systems have similar characteristics and mechanisms. This is also due to the European Council's strong motivation for communication and exchange of experience among Member States. (Milana–Holford 2014). An international study emphasizes the importance of training directly related to employment due to the population decline and labour shortage in Hungary. At the same time, new workforce participation is only possible from low-skilled, inactive social groups, who do not have the appropriate competencies. (Kersh–Toiviainen 2017).

**Material and methods**

In our study, we looked for the characteristics of Hungary in terms of the extent and distribution of participation in adult education within the European Union. First, we wondered how the level of participation in training changed in the post-accession period influenced by a changing economic environment. Then we examined some of the more important statements on fields and providers of education, and categories of job-related trainings and informal learning. Information on education and training in the European Union is available from the adult education survey (AES). The AES measures participation in learning activities with a longer reference period (12 months preceding the survey interview). It is t is carried out less frequently (every five years) than the labour force survey which provides information on participation in education and training in the four weeks preceding the survey interview. The most recent wave of the survey was conducted between July 2016 and March 2017 (and named the 2016 AES).

**Results**

According to the data provided by Eurostat, the participation in adult education in Hungary, which was characterized by an extremely low participation rate a decade earlier, has become above average in 2017 (Figure 1). At EU level the participation rates in education and training were almost the same for men and women. In Hungary (and in three other Member States) men (58.7%) were considerably more likely than women (52.7%) to have participated in education and training. Increased activity was observed in both younger and older age groups. Hungary's data were above average in all educational categories, but outstanding in the low-skilled. Only in Sweden was this indicator higher.

Based on the education fields, business, administration and law training has proven to be the most popular in both the European Union (17.3%) and Hungary (18.9%). The high ratio of missing answers (24.2%) had a major impact on the proportion of marked categories. As a result, only the proportion of agriculture, forestry, fisheries and veterinary trainings (4.1%) are above the EU average (1.7%). Particularly significant problems are raised by the extremely low participation rates in health and education training (Figure 2).

189
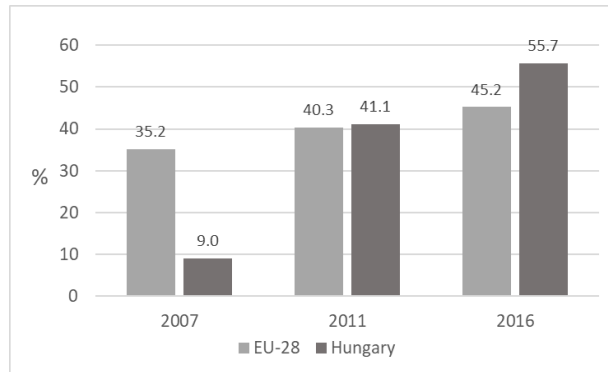
*Figure 1*. Participation rate in education and training (last 12 months), 2016 (% of adults aged 25–64)
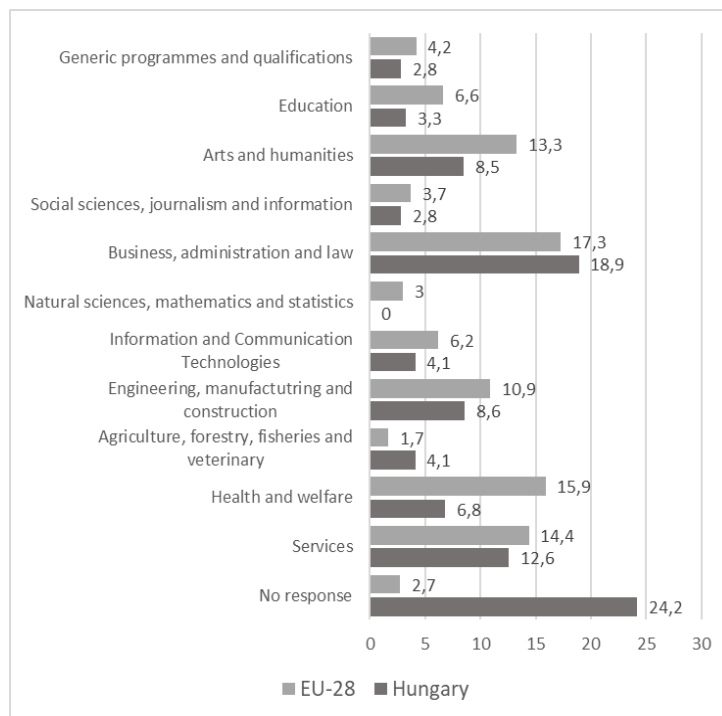Source: Eurostat – Adult lerning statistics (online data code: trng_aes_100)



*Figure 2*. Distribution of adult education and training by field of education, 2016 (% share of total hours spent by adults aged 25–64 on formal and non-formal education and training)
Source: Eurostat – Adult lerning statistics (online data code: trng_aes_174)

Employers were the most common providers of non-formal education and training activities, providing more than half (57.9 %) of such activities in Hungary according to the 2016 adult education survey (Table 1). In addition, Hungary had lower values in almost every category, with the exception of the higher proportion of chambers of commerce (7.7%).

| **Provider categories** | **Hungary** | **European Union** |
|---|---|---|
| Employer | 57.9 | 35.4 |
| Non-formal education & training institution | 13.0 | 17.7 |
| Formal education institution | 4.1 | 7.6 |
| Commercial institution where education & training is not main activity | 3.8 | 9.4 |
| Employers' organisation, chamber of commerce | 7.7 | 4.2 |
| Non-commercial institution (e.g. library) | 1.8 | 3.4 |
| Non-profit association | 3.3 | 6.7 |
| Individual | 3.3 | 6.0 |
| Trade union | 0.0 | 1.1 |
| Other | 1.0 | 6.3 |

*Table 1.* Providers of non-formal education and training activities, 2016 (% share of all non-formal activities of adults aged 25-64)
Source: Eurostat – Adult lerning statistics (online data code: trng_aes_170)

In Hungary, the share of job-related non-formal adult education and training (55.6%) is significantly below the EU value (79.4%). Less than half of the non-formal instruction was both job-related and sponsored by employers in the country (48.2 %), only ahead of Greece. The most significant backlog was in the case of higher education (Figure 3).
In 2016, 40.6% of adults aged 25-64 in Hungary reported participation in any informal learning in the 12 months preceding the interview. That is only two thirds of the EU value and the significance of all forms of informal learning less than the EU average. The backlog is smaller in free forms of learning (using computer, printed material) than those organized by libraries and museums (Figure 4).
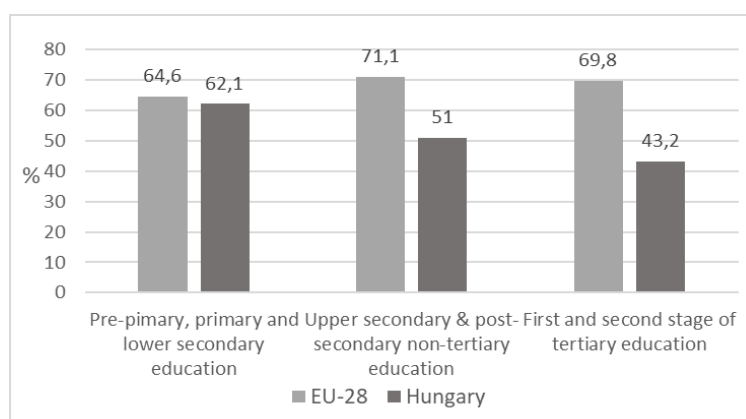
*Figure 3*. Share of job-related non-formal adult education and training sponsored by employers, 2016 (% share of all non-formal learning activities)
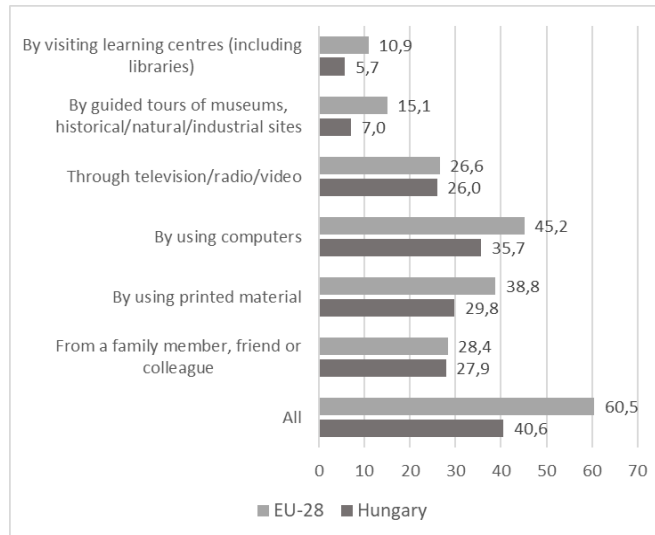Source: Eurostat – Adult lerning statistics (online data codes: trng_aes_188, trng_aes_189 and trng_aes_190)



*Figure 4*. Participation rate in dirrerent informal learning forms, 2016 (% share of all non-formal learning activities)
Source: Eurostat – Adult lerning statistics (online data codes: trng_aes_200)

## Conclusions

Adult learning has extraordinary importance for the achievement of EU's objectives in development of the knowledge economy. Accordingly, participation in adult education in the EU increased by 10 percentage points between 2007 and 2016. In Hungary, the increase was a multiple of this, by which it worked its disadvantage and exceeded the EU average. This was mainly due to the severe labour shortage in Hungary as a result of declining population and new industrial investments. Non-formal education and training activities are provided by 57.9% of employers. The breakdown by profession shows that popularity of some training fields are below the EU average. Participants in adult education and training generally have a lower level of education, which is due to the need to bring in new workers into the world of work. Furthermore, it can be seen from the statistics that the population is more involved in training due to external influences (government, employer) and the level of internal motivation can still be increased.

## Summary

Adult education is one of the most important means of solving various economic and social problems today. Its role has grown tremendously in recent decades with the spread of lifelong learning concept. Adult learning is also an indispensable tool for Hungary to catch up with developed European countries. In addition to adjusting for labour market fluctuations, it has an important role to play in involving inactive social groups. In recent years, Hungary has experienced a significant shortage of labour which,

in addition to immigration, can be fixed mainly through training and retraining. The Hungarian population is still lagging far behind in the use of informal learning, which could be improved by change of attitude.

**Keywords:** adult education, lifelong learning, training for employees, informal learning, international differences

## Literature

BAJUSZ K. (2015): The second chance education system in Hungary. In: Németh, Balázs (szerk.) Research and Development in Adult Learning and Education in Hungary. Bonn, Németország: Institut für Internationale Zusammenarbeit des Deutschen Volkshochschul-Verbandes e. V. (IIZ/DVV), pp. 52-59.

BRANDT, N. (2015): Vocational training and adult learning for better skills in France. OECD Economics Department Working Papers No. 1260, 39 p.

CSOBA J. (2010): A tisztes munka – A teljes foglalkoztatás: a 21. század esélye vagy utópiája? L'Harmattan Kiadó, Budapest, 271 p.

CSOMA GY. (2005): A magyar felnőttképzés új korszakváltásának értelmezéséhez. – Gondolatok tizenegy témában kommentátorokkal. In: Csoma Gy.: Andragógiai szemelvények. Nyitott könyv, Budapest, pp. 264-282.

FOUARGE, D.–SCHILS, T.–DE GRIP, A. (2012), "Why do low-educated workers invest less in further training? = Applied Economics 45(18), pp. 2587-2601.

JÁNOSSY D.–KISS D.–PULAY GY. (2009): A felnőttképzési rendszerek hatékonysága nemzetközi összehasonlításban. Állami Számvevőszék Kutatóintézete, Budapest, 85 p.

KERSH, N.–TOIVIAINEN, H. (eds.) (2017): Broad Research on Adult Education in the EU. Project report (EduMAP) 512 p.

MILANA, M.–HOLFORD, J. (eds.) (2014): Adult Education Policy and the European Union. Theoretical and Methodological Perspectives. Research on the Education and Learning of Adults (vol. 1). Sense Publishers, Rotterdam, 179 p.

RECHNITZER J. (2008): A regionális fejlődés új erőforrása: a tudás. In: Baranyi B. – Nagy J. (szerk.) Regionalitás, területfejlesztés és modernizáció az Észak-alföldi régióban. DE AMTC–MTA RKK, Debrecen, pp. 31-44.

VARGA J. (2006): Humántőke-fejlesztés, továbbtanulás felnőttkorban, "skill"-ek és kompetenciák. In: Kolosi T.–Tóth I. Gy.–Vukovich Gy. (szerk.): Társadalmi Riport, TÁRKI, Budapest, pp. 287–300.

# IMPACTS OF IRRIGATION AND FERTILISATION ON THE YIELD, WATER CONSUMPTION AND WATER UTILISATION OF SEED GROWN YELLOW ONION

*Ildikó SZALÓKINÉ ZIMA*

SZIE AGK, Tessedik Campus, 5540 Szarvas, Szabadság u. 1-3.,
e-mail: zima.ildiko@gk.szie.hu

## Introduction

Yellow onion is traditionally considered as a drought-tolerant plant with low water demand. Before conducting the experiment I have set up the hypothesis of seed grown onion, for multiple reasons, having larger demand for irrigation compared to onion sets. On the one hand, onion seeds are small and the sowing depth is only 2 to 3 cm. Irrigation is often needed for uniform and quick emergence. On the other hand, seed grown onion develops slowly since it has a disadvantage (there is less reserve nutrient in the seed than in the onion set). Furthermore, its growing season is shifted toward a later period, when frequent absence of rainfall can hinder the development of onions. In case of irrigation the importance of nutrient replenishment is increased as well. Based on these assumptions I examined the impacts of different levels and combinations of irrigation and fertilisation on the yield and water consumption of seed grown yellow onion.

## Literature review

Favourable level of nutrition depends on many factors including water supply. Without irrigation and in particularly arid years the optimal dosage is lower than in irrigated or wetter areas *(Gebregwergis et al., 2016).* Irrigation increases the yield of yellow onion compared to that of non-irrigated sections (*Patel and Rajput 2013, Pejic et al. 2011).* Several literature sources contain data about the relation between irrigation water and the amount of yield. *Ruzsányi (*1975) *and Szalóki* (1988) in their lysimeter and outdoor production experiments concluded that in case of arable crops irrigation water – as long as it serves the satisfaction of plants' water demand – is utilised better than either small amount of irrigation or precipitation.

## Material and methods

Experiments were implemented in Szarvas, at the lysimeter research facility of Research Institute for Fisheries and Aquaculture. The soil was clay-loam with excellent phosphorus and potassium content, while it had medium nitrogen supply. The size of lysimeters was 1x1x1 metre (1 cubic metre). These were built in the middle of the 32 square metre parcels. Since they were closed from all sides, both vertical and horizontal water movement can be averted. Thus, both water and nutrient turnover can be measured in a more precise way than in the parcels. The examined plant species was yellow onion. I chose varieties that can be seed grown, with large water demand, long vegetation period and high yield. Banko and Sonesta onions were used in the two-year-long examination (i.e. in 2000 and 2001). Row space and planting distance was 25 cm

and 3 cm, respectively. The previous cropping was paprika (in 2000) and sweet corn (in 2001). Table 1 summarises the precipitation conditions of these two years.

| year | winter half-year | months | | | | | | | annual |
|------|------------------|--------|----|----|----|----|----|-------|--------|
| | | 04 | 05 | 06 | 07 | 08 | 09 | 04-09 | *mm* |
| **2000** | **286** | 37 | 23 | 13 | 59 | 14 | 55 | **201** | *487* |
| **2001** | **174** | 49 | 19 | 138 | 80 | 46 | 114 | **447** | *621* |

*Table 1: Monthly amount of precipitation regarding the winter half year and the vegetation period (mm). Lysimeter Research Facility, Szarvas*

The two-factor experiment was set up by using four water supply and four nutrient supply treatment combinations within a long-term experiment carried on for 30 years. The main factor was water supply with the following levels: $a_1$: control group without irrigation; $a_2$: irrigated with one third of the total water demand; $a_3$: irrigated with two thirds of the total water demand; $a_4$: irrigated with the total water demand of the plant. In case of the optimal irrigation level soil moisture content was kept between 50% and 100% of the disponible water capacity as regards of the upper 10 to 30 cm layer of the soil. Water was applied by using drip irrigation method in 10 to 30 mm dosages. Within each water supply level nutrient supply was also determined as follows: $b_1$; $b_2$; $b_3$ and $b_4$ were meant 50; 100; 150 and 200 kg/ha nitrogen (N) active substance, respectively. The total number of combinations was 16. These were indicated by two-digit numbers where the first digit corresponded water supply level and the second digit showed the level of fertilisation (e.g. 11=$a_1b_1$).

**Results**

In this article I describe the examination results of two years (2000 and 2001).
2000 was the drier year, although in the beginning it brought considerable water surplus and threatened with stagnating water. However, precipitation of the growing period settled around the average only in July and September, while in all the other months only 22 mm of rain fell. Acceptable emergence could be only reached by irrigation. We could start irrigating rather late, in 1st May (since Holt-Körös river was filled late due to flooding hazard), when it was already hot. As a consequence, we had to irrigate the entire experimental field, including the control group, in each second or third day. Late emergence played a role in having lower yield in the optimal water treatment category. As it can be seen in Table 2 yields in parcels receiving only emerging and starting irrigation (130 mm) was around 20 t/ha, while this value of those parcels having better water supply (of 200; 250 or 300 mm) was between 30 and 50 t/ha. Differences among the treatments regarding the amount of irrigation water are 70; 120 and 170 mm. Yield differences are considerable in relation with the averages of fertilisation treatments as well, compared to that of receiving emerging irrigation only: 14.7; 17.6 and 21.3 t/ha. As for favourable nutrient supply, the yield difference is even higher: 17; 22 and 32 t/ha related to the control group. In case we compare to the surplus yield differences to the alterations of irrigation water (Tt/Iw) we receive the values of 210; 146 and 125 kg/ha/mm for the utilisation of irrigation water regarding the averages of fertilisation treatments. As for good nutrient supply 1 mm of water replenishment resulted 246; 189 and 185 kg/ha increase in the yield. The impact of fertilisation was more pronounced

when accompanied by increased water supply. In case of the best water access the effect of fertilisation exceeded 20 t/ha. Yield related to one unit of water actually consumed by the plants (T/ET) was the lowest in this year, especially in the non-irrigated group (62.5 kg/ha/mm). By increasing the level of water replenishment the productivity of ET has improved (87.2; 91and 94.8 kg/ha/mm), but it was more moderate than in other years, due to the lower yields resulted by late emergence as well as sparse population.

| treatment | irrigation water (a) | N (b) | yield (T) | Surplus yield (Tt), t/ha | | Tt/Iw | ET | T/ET |
|---|---|---|---|---|---|---|---|---|
| code | mm | kg/ha | t/ha | impact of irrigation | impact of fertilisation | kg/ha/mm | mm | kg/ha/mm |
| 11 | 130 | 50 | 19.3 | 0.00 | 0.00 | 0.0 | 308 | 62,6 |
| 12 | 130 | 100 | 20.2 | 0.00 | 0.90 | 0.0 | 314 | 64,4 |
| 13 | 130 | 150 | 21.3 | 0.00 | 2.00 | 0.0 | 320 | 66,6 |
| 14 | 130 | 200 | 17.9 | 0.00 | -1.40 | 0.0 | 318 | 56,3 |
| a₁ (b₁-b₄ average) | | | 19.7 | 0.00 | 0.37 | 0.0 | 315 | 62.5 |
| 21 | 130+70 | 50 | 29.5 | 10.20 | 0.00 | 145.7 | 366 | 80,6 |
| 22 | 130+70 | 100 | 34.7 | 14.50 | 5.20 | 207.1 | 395 | 87,8 |
| 23 | 130+70 | 150 | 38.2 | 16.90 | 8.70 | 241.4 | 415 | 92,1 |
| 24 | 130+70 | 200 | 35.1 | 17.20 | 5.60 | 245.7 | 397 | 88,4 |
| a₂ (b₁-b₄ average) | | | 34.4 | 14.70 | 4.88 | 210.0 | 393 | 87.2 |
| 31 | 130+120 | 50 | 32.3 | 13.00 | 0.00 | 108.3 | 382 | 84,7 |
| 32 | 130+120 | 100 | 35.7 | 15.50 | 3.40 | 129.2 | 396 | 90,2 |
| 33 | 130+120 | 150 | 40.8 | 19.50 | 8.50 | 162.5 | 429 | 95,0 |
| 34 | 130+120 | 200 | 40.1 | 22.20 | 7.80 | 185.0 | 425 | 94,3 |
| a₃ (b₁-b₄ average) | | | 37.2 | 17.55 | 4.93 | 146.3 | 408 | 91.0 |
| 41 | 130+170 | 50 | 27.2 | 7.90 | 0.00 | 46.5 | 365 | 74,5 |
| 42 | 130+170 | 100 | 36.3 | 16.10 | 9.10 | 94.7 | 416 | 87,3 |
| 43 | 130+170 | 150 | 50.4 | 29.10 | 23.20 | 171.2 | 455 | 110,8 |
| 44 | 130+170 | 200 | 50.1 | 32.20 | 22.90 | 189.4 | 469 | 106,8 |
| a₄ (b₁-b₄ average) | | | 41.0 | 21.33 | 13.80 | 125.4 | 426 | 94.8 |
| b₁ | a₁-a₄ average | 50 | 27.1 | 10.37 | 0.00 | 100.0 | 355 | 75,6 |
| b₂ | a₁-a₄ average | 100 | 31.7 | 15.37 | 4.65 | 144.0 | 380 | 82,4 |
| b₃ | a₁-a₄ average | 150 | 37.7 | 21.83 | 10.60 | 192.0 | 405 | 91,1 |
| b₄ | a₁-a₄ average | 200 | *35.8* | 23.87 | 8.73 | 207.0 | 402 | 86,4 |
| | a x b (average) | | 33.1 | 17.86 | 7.99 | 161.0 | 386 | 84.0 |

Table 2: Impacts of irrigation and nutrient replenishment on the yield, water consumption and water utilisation of Banko yellow onion, Szarvas, 2000

In spring 2001 – although not much snow has fallen during winter – moisture content of the soil was around full saturation in the lysimeters at the time of seeding (i.e. beginning of April). It means that the upper 80 cm layer of the soil contained 280 to 310 mm of water. Due to the approximately 50 mm of rain that fell in the first half of April the onion emerged early and evenly. Following this period, up until 4th June only 20 mm of rain arrived, so the plants had to be irrigated three times. The amount of water applied during these treatments is 20; 40 and 60 mm. Precipitation in June remarkably exceeded

the water demand of onion. Great amount of seepage water was created, too. Following 10th July irrigation became necessary again. We applied 10; 20 and 30 mm of water three times until 8th August. The total amount of irrigation water was 50; 100 and 150 mm, while the precipitation was accounted for 390 mm. Plants receive a combined sum of 440; 490 and 540 mm of water during the vegetation period – it is considerably more compared to the previous year. Runoff water was only 9 mm in the control group, while 26; 40 and 50 mm in the irrigated groups. Evapotranspiration (ET) was really high, an average of 431 mm even in case of the non-irrigated treatment, while it reached 466; 491 and 527 mm in the irrigated groups (see Table 3), therefore it increased considerably compared to 2000. One of the reasons is the early sowing and emerging of Sonesta onion variety as well as its late harvest that was postponed to October due to the large amount of rain fell in September. The other reason is the high number of plants due to the excellent emergence rate. There is around 100 mm difference between the two extreme values of evapotranspiration. These alterations were generally caused by irrigation. Fertilisation had hardly influenced ET: only 30 mm difference could be observed at the largest irrigation treatment, although it has not reached the limit of reliability. Average yield of onion in non-irrigated parcels were relatively high (40 to 55 t/ha). However, irrigation had important effects by facilitating the initial development of the plants in the arid period between May and early June. Yield-increasing impact of irrigation in the average of fertilisation treatments resulted 8; 14 and 21 t/ha, while in case of good nutrient supply it reached 25 to 40 t/ha. Effect of fertilisers increased depending on the water supply. Without irrigation 150 to 200 kg/ha N fertiliser active substance had a depressive effect of -2 to -10.8 t/ha. At the same time fertilisation led to 19 to 24 t/ha yield increase in $a_4$ parcels.

Utilisation of irrigation water was more moderate than in arid years, but it was important whatsoever. In the average of factor b it surpassed the utilisation of natural precipitation (166; 139 and 141 kg/ha/mm). This effect was even more pronounced in $b_3$ and $b_4$ treatments. Productivity of ET in non-irrigated treatment was remarkably higher in this year than in the previous, more arid one. Yield related to 1 mm of ET increased in a more moderate way in this, second year (113; 123; 128 and 132 kg/ha/mm).

**Conclusions**

N-fertilisers increased, by 2 t/ha, the yield of onion without irrigation and compared to the 50 kg/ha dosage up to the 150 kg/ha dosage in the arid year when emerging irrigation was applied (i.e. in 2000). As for the more humid year, 2001, the increase was observed until the 100 kg/ha dosage and its extent was 4.2 t/ha. However, the largest amount of fertiliser when applied without irrigation decreased – in the average of the two years – the yield significantly (by 6.1 t/ha). Water consumption (ET) of the onion varied between 315 and 426 mm in 2000 regarding the control group and the one with optimal water supply. The same values were between 431 and 527 mm in 2001. Yield related to 1 mm of water consumption (T/ET) spread between 63 and 95 kg as well as 113 and 132 kg, depending on the treatments.

Increasing the water replenishment irrigation levels increased yields considerably while showing positive correlation with the extent of nutrient replenishment (from 20 t/ha to 41 t/ha and from 49 t/ha to 70 t/ha in 2000 and 2001, respectively).

| treatment code | irrigation water (a) mm | N (b) kg/ha | yield (T) t/ha | Surplus yield (Tt). t/ha impact of irrigation | Surplus yield (Tt). t/ha impact of fertilisation | Tt/Iw kg/ha/mm | ET mm | T/ET kg/ha/mm |
|---|---|---|---|---|---|---|---|---|
| 11 | **0** | **50** | 51.0 | 0.00 | 0.00 | 0 | 426 | 120 |
| 12 | **0** | **100** | 55.2 | 0.00 | 4.20 | 0 | 432 | 128 |
| 13 | **0** | **150** | 49.0 | 0.00 | -2.00 | 0 | 434 | 113 |
| 14 | **0** | **200** | 40.2 | 0.00 | -10.80 | 0 | 432 | 93 |
| **a₁** (b₁-b₄ average) | | | **48.9** | **0.00** | **-2.10** | **0** | **431** | **113** |
| 21 | **50** | **50** | 59.0 | 7.90 | 0.00 | 159 | 454 | 130 |
| 22 | **50** | **100** | 61.4 | 6.20 | 2.40 | 124 | 468 | 131 |
| 23 | **50** | **150** | 55.2 | 6.20 | -3.80 | 124 | 473 | 117 |
| 24 | **50** | **200** | 53.2 | 13.00 | -5.80 | 259 | 469 | 113 |
| **a₂** (b₁-b₄ average) | | | **57.2** | **8.30** | **-1.80** | **166** | **466** | **123** |
| 31 | **100** | **50** | 56.6 | 5.60 | 0.00 | 56 | 484 | 117 |
| 32 | **100** | **100** | 64.5 | 9.30 | 7.90 | 93 | 487 | 132 |
| 33 | **100** | **150** | 65.1 | 16.10 | 8.50 | 161 | 488 | 133 |
| 34 | **100** | **200** | 64.9 | 24.70 | 8.30 | 247 | 503 | 129 |
| **a₃** (b₁-b₄ average) | | | **62.8** | **13.90** | **6.20** | **139** | **491** | **128** |
| 41 | **150** | **50** | 56.1 | 5.10 | 0.00 | 34 | 514 | 109 |
| 42 | **150** | **100** | 68.7 | 13.40 | 12.60 | 90 | 519 | 132 |
| 43 | **150** | **150** | 74.8 | 25.80 | 18.70 | 172 | 531 | 141 |
| 44 | **150** | **200** | 80.2 | 40.00 | 24.10 | 267 | 544 | 147 |
| **a₄** (b₁-b₄ average) | | | **70.0** | **21.10** | **13.90** | **141** | **527** | **132** |
| **b₁** | a₁-a₄ average | **50** | 55.7 | 6.20 | 0.00 | 83 | 469 | 119 |
| **b₂** | a₁-a₄ average | **100** | 62.4 | 9.63 | 6.77 | 102 | 477 | 131 |
| **b₃** | a₁-a₄ average | **150** | 61.0 | 16.03 | 5.35 | 152 | 482 | 126 |
| **b₄** | a₁-a₄ average | **200** | 59.6 | 25.88 | 3.96 | 257 | 487 | 121 |
| **a x b (average)** | | | **59.7** | **14.43** | **5.36** | **149** | **479** | **124** |

Table 3: Impacts of irrigation and nutrient replenishment on the yield, water consumption and water utilisation of Sonesta yellow onion, Szarvas, 2001

## Summary

In this article I examined the impacts of four levels of water and nutrient supply in 16 combinations on the yield and water consumption of seed grown yellow onion using the data of a two-year-long period. The experiments were conducted in the Szarvas Lysimeter Research Facility on clay-loam soil with excellent phosphorus and potassium content, while it had medium nitrogen supply.

Nitrogen-fertilisers increased, by 2 t/ha, the yield of onion without irrigation and compared to the 50 kg/ha dosage up to the 150 kg/ha dosage in the arid year when emerging irrigation was applied (i.e. in 2000). As for the more humid year, 2001, the increase was observed until the 100 kg/ha dosage and its extent was 4.2 t/ha. However, the largest amount of fertiliser when applied without irrigation decreased – in the average of the two years – the yield significantly (by 6.1 t/ha). Increasing the water replenishment irrigation levels increased yields considerably while showing positive correlation with the extent of nutrient replenishment (from 20 t/ha to 41 t/ha and from 49 t/ha to 70 t/ha in 2000 and 2001, respectively).

**Literature**

Gebregwergis, F. - Kebede, W. -Yibekal, A.  (2016): Effect of Irrigation Depth and Nitrogen Levels on Growth and Bulb Yield of Onion (Allium cepa L.) at Algae, Central Rift Valley of Ethiopia. International Journal of Life Sciences. Vol. 5 No. 3. 152-162. p.

Patel, N.  - Rajput, T.B.S. (2013):  Effect of deficit irrigation on crop growth, yield and quality of onion in subsurface drip irrigation.  International Journal of Plant Production. 7(3):417-436

Pejić, B.- J. Gvozdanović-Varga - Milić, S.- Ignjatović-Ćupina, A. - Krstić, Dj. - Ćupina, B. (2011): Effect of irrigation schedules on yield and water use of onion (Allium cepa L.). African Journal of Biotechnology,10: 2644-2652.

Ruzsányi L. (1975): A növényállomány evapotranszspirációjának vizsgálata különböző tápanyagellátottsági szinten. Debrecen, Kandidátusi értekezés.

Szalóki S. (1988): A természetes vízellátottság és az aszály megítélése, mérési lehetőségei, módjai. In: Hanyecz: Az öntözéses gazdálkodás újabb kutatási eredményei, Szarvas, ÖKI 15-26.p.

# THE USE OF UAV TECHNOLOGY FOR DIGITIZING NATURAL RESOURCES

*Laura ȘMULEAC – Imbrea FLORIN – Adrian ȘMULEAC – Mirela AHMADI*

Banat's University of Agricultural Sciences and Veterinary Medicine „King Michael I of Romania" from Timisoara, 119, Aradului Street, 300645, Timisoara, Romania, e-mail: adriansmuleac.as@gmail.com; laurasmuleac@yahoo.com;

## Introduction

Using aerial vehicles without pilot (UAV-unmanned aerial vehicle) or Drone has seen a rapid development, over the last decade, in order to obtain spatial information of the Earth's surface. This scientific paper was realized for the Hydrotechnical Node of Topolovățu Mic, from Timis County and has as purpose the processing of aerial images, obtained from a Phantom4 Pro device, which is capable to capture video at 4K resolution at 30 frames per second and Full HD 1080p at 120 frames per second for a slow motion with a Sony EXMOR camera that can take photos at 20 megapixel, with a maximum flight speed of 20m/s. The device is equipped with positioning equipment, which connects to both GPS and GLONASS, allowing it to connect faster to satellites and position itself with high accuracy in the air. Phantom 4 automatically records the details of each flight made, so you can check your previous flights.In order to achieve the 3D model, were used oblique and vertical images with the highest accuracy. Nadir imaging was performed at an average height above ground (AGL–Above Ground Level) of approx. 113m. The imaging data was processed with the AgiSoft PhotoScan program using a number of 273 aerial images (total 287 aerial images). For image processing, the sotware proposes for each processing stage, different parameters that determine the precision and time of the final processing of the Topolovățu Mic Hydrotechnical Node. The images were georeferenced using the control points from the ground. In the present paper, in order to achieve georeference, with very high precision, we have use of 18 control points (total 26 GCP) situated on the ground (GCP-Ground Control Points), which were determined in the field using a GNSS receiver in RTK mode (Leica GS08), obtaining coordinates in the Stereographic Projection System 1970. So, data exported from PhotoScan have provided textures, clouds of points, orthomosaics in red, green and blue spectral bands, obtaining a final precision of georeference by milliseconds order. The RMS error values being 0,029480 m on X; 0,041659 m on Y and 0,042573 m on Z, a resolution of 8,28 cm/pixel. From the 273 aerial images georeferenced on 18 GCP control points, were obtained 32.119.272 points. The final stage of the data processing work includes the generation of orthophotomaps, mosaics, and raster images, in TIN and DEM formats as well as the generation of clouds of point (Point Cloud). Combining 2D and 3D, which allow classifying points and filter them for accurate objects modeling. At the end of aerial data post-processing UAV, were generated topographic models, was made data export in various formats, including Google Earth and LIDAR files (LAS), which then could be processed and viewed with other special programs such as: Global Mapper, Google Earth, Surfer, AutoCad, CloudCompare.

**Literature review**

Use of UAVs is ideal to purchase research data at resolutions ranging from 0.5 to 2 cm. The programs used to process monitoring and reconstruction data may vary, as price, from the most expensive to the ones obtained as Open Source, obtaining data at high resolution (Rusnák, Miloš et al., 2017). Although UAVs have their origins in military contexts, they have also become valuable for scientific and commercial applications, especially during the previous decade (Nex F. and Remondino F., 2014). The use field of UAVs is multiple, in civil applications, the reconstruction of high resolution surfaces (Anders, N. et al., 2013), the realization of cultural heritage and archeology sites, hydrology (Șmuleac L., et al., 2017), in agriculture for monitoring the crops (Zhang, C. and Kovacs, J.M., 2012), in order to manage natural disasters, in topography (Șmuleac A. et al., 2016) and mapping (Herbei M.V. et al., 2016) and mapping (Barnes, G. and Volkmann, W., 2015) and wildlife observation (Koh, L.P. and Wich, S.A., 2012), in engineering (Uysal M., Toprak A.S., 2015). In this context, Pajares offers a detailed review of the wide range of applications of remote sensing based on UAV (Pajares, G., 2015).

Turner and his colleagues in 2015 highlighted the fact that it is the latest technology to realize digital photogrammetry in real time, as well as to obtain a land elevation model (DEM), but with the inconvenience of not realizing images under dense vegetation (D. Turner et al., 2015). UAV photogrammetry generates high resolution topographic data essential for 3D terrain modeling. Operations approached for UAV imaging and data processing consist of several essential steps: preparation of UAV equipment, calibration, establishing control points (GCP), point cloud processing and analysis as well as obtaining orthophotomaps. Indeed, remote sensing methodologies and techniques for 3D modeling of a cultural patrimony allow the generation of very realistic 3D results that can be used for a variety of purposes, such as the development of historical documentation (El-Hakim et al., 2007), and the realization of digital preservation, monitoring in time of objectives with UAV technologies (Bruno, F. et al., 2010) and viewing 3D data.

With regard to photogrammetric data analysis, software programs uses different approaches, both with commercial solutions and with open source solutions (Remondino F. et al., 2014; Agisoft PhotoScan, 2014).

**Material and methods**

In order to obtain the aerial data required for this study, the research was divided into 4 stages, namely: stage 1 refers to the preliminary study, stage 2 to the positioning of the GCP control points, stage 3 to obtaining the aerial data, stage 4 refers to processing of aerial data. At the same time for the acquisition of data for mapping with UAV equipment, the following steps will be taken: land recognition and identification of possible hazards in order to make the flights, identification of take-off and landing points, placement of control points at the ground (GCP), aerial imaging of the area of study, quality assurance and data processing, data precision assessment, image processing with Agisoft PhotoScan Professional Version: 1.4.0 build 5650 (64 bit), 3D mapping and 3D extraction operations, cloud point grading and orthophotomaps.

## Results

This research was carried out on the Topolovățu Mic Hydrotechnical Node, located in Timis County at approx. 60 km from the city of Timisoara and approx. 10 km from the city of Lugoj, which is located strategically at the Timis-Bega discharge channel on the Timis River. The purpose of this Hydrotechnical Node, built in 1758 by engineer Maximilian Fremaut (an engineer who carried out essential water management works in the 18th century in Banat) being one of the oldest arrangements from Romania, is to deviate in drought weather the waters of the Timiş River in the Bega Channel, in order to balance the flow or otherwise to divert the water from the Timis River to the Bega River.

Land Recognition and setting Ground Control Point (GCP) was the first step in the aerial image collection process. In order to complete the data processing operations including georeferencing, a number of 18 control points (GCP) were used, points that were determined with the Leica GPS model, GS08, using the RTK method (Table 1, Figure 2). Managing control points (GCP) and the correction of those locations are particularly important for carrying out accurate mapping with UAVs. Three or more control points (GCPs) are required in order to achieve the georeferencing of the obtained orthophotoplane, but the more the number of them will increase, the better the precision and the quality of the data acquisition will be of high precision. After the AgiSoft PhotoScan user manual, at least 10 control points (GCPs) are required to referencing the model, and they will need to be distributed in lines or create regular patterns, such as equilateral triangles. Another relevant condition for distributing control points is their arrangement at different vertical heights (at different altitudes, if this is possible), including their positioning on riverside, canals, terraces, as well as the parameters for making the flight plan.

To achieve the 3D model and get the point cloud (Point Cloud), were used oblique and vertical images for the best accuracy. Nadir imaging was performed with an AGL (AGL Above Ground Level) of 13. The aerial images were processed with the AgiSoft PhotoScan program using for processing 273 aerial images.

The set of 273 images from the shooting flights were uploaded to AgiSoft PhotoScan, and the control points from the ground determined with the GPS equipment were identified and positioned manually (Figure 3). In PhotoScan, the tagging algorithm is a priority and requires considerable verification and adjustment by the human operator for placement of the marker point. Marking centers have been carefully checked and manually adjusted where it was necessary. Coordinates for those 18 GCP points were loaded and an initial alignment was performed (Table 2)

| GPS point No. | X (m) | Y (m) | Z (m) | GPS point No. | X (m) | Y (m) | Z (m) |
|---|---|---|---|---|---|---|---|
| GPS1 | 478944,7491 | 238505,967 | 102,9181 | GPS14 | 478846,8925 | 238491,049 | 102,3714 |
| GPS2 | 478891,8496 | 238420,72 | 102,3054 | GPS15 | 478825,2726 | 238443,122 | 102,2533 |
| GPS3 | 478897,9112 | 238467,129 | 102,0203 | GPS16 | 478823,3087 | 238490,39 | 105,3035 |
| GPS4 | 478892,0439 | 238387,666 | 105,7409 | GPS17 | 478990,9908 | 238574,92 | 102,8973 |
| GPS5 | 478947,873 | 238529,907 | 99,9782 | GPS19 | 478998,4071 | 238599,865 | 102,8633 |
| GPS6 | 478902,9092 | 238498,192 | 99,9478 | TMIC9 | 478872,351 | 238506,115 | 102,6415 |
| GPS7 | 478906,4634 | 238517,078 | 98,1452 | INT7 | 478935,2289 | 238565,648 | 101,1011 |
| GPS8 | 478914,5456 | 238545,496 | 98,1054 | INT6 | 478902,5447 | 238516,549 | 98,053 |
| GPS9 | 478893,0948 | 238551,349 | 100,0047 | INT5 | 478975,67 | 238530,71 | 106,7927 |
| GPS10 | 478882,4946 | 238505,563 | 99,9654 | INT4 | 479049,0716 | 238483,42 | 103,3759 |
| GPS11 | 478923,0232 | 238604,629 | 101,7695 | TMIC1 | 479067,2863 | 238501,567 | 102,1107 |
| GPS12 | 478924,383 | 238634,051 | 102,7919 | TMIC2 | 479124,9429 | 238508,712 | 102,6469 |
| GPS13 | 478869,8698 | 238549,083 | 102,8562 | TMIC3 | 479069,033 | 238586,241 | 105,0858 |

*Table 1* Presentation of coordinates of GCP soil control points in Stereographic 1970 Projection System, NH Topolovățu mic

The steps involved in generating a cloud of points **3D-Point Cloud** along with the estimated position and the position of the camera stations and a solution for camera model parameters are similar regardless of the SfM/MVS software used. To accomplish this study, the main purpose was to ensure that all scenarios were based on the same **PhotoScan** project, resulting minimal differences in processing stages. This study, which contained 273 images of high quality, high resolution, from both nadir and oblique flights, has an overlap of 80% -90%. Any gloss of water (reflector) was masked from each image. The GPS navigation data on the UAV equipment was used to geocode the images, so an initial alignment was made based on these approximate positions.



Fig. 1. The type of target use in field



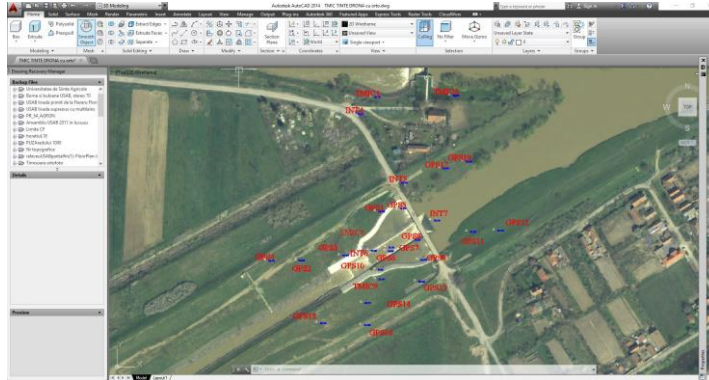Fig. 2. Leica equipment GPS Leica GS08 use to determinated the target

Fig. 3 – Identifying markers at the ground (GCP)

The 19 GCPs were loaded into the project, and primary alignment based on image coordinates helped identify the markers from each image. Each marker has been reviewed and edited when it is necessary, in order to ensure that it has been located and centered in as many images as possible. Once these markers were placed (Figure 4), the baseline project was used to: analyze and change the coordinate system for the drones images (Figure 4).



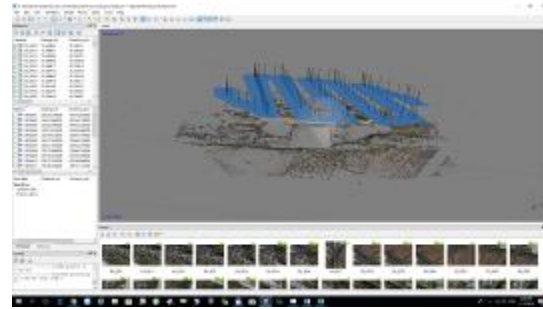Fig. 4 – Presentation of GCP ground points



Fig. 5 First alignment of aerial images

The steps taken to process the data were as follows

**1.** Importing photos and viewing the WGS1984 coordinates obtained - 273 images were imported (Figure 6).Calibrarea imaginilor cu AgiSoft Lens.

**2.** Gross data processing and image alignment with Agisoft PhotoScan Professional Version: 1.4.0 build 5650 (64 bit). It was found that from each image was extracted 40000 points

**3.** View the errors of the ground markers at the time of their completion and their positioning on land marks from the ground (Table 2).

**4.** Obtaining dense point clouds (Build Dense point Cloud) - For a results near reality with high resolution, we will go on representing the cloud points by opting for Hight and an aggressive filtering (Figure 6).
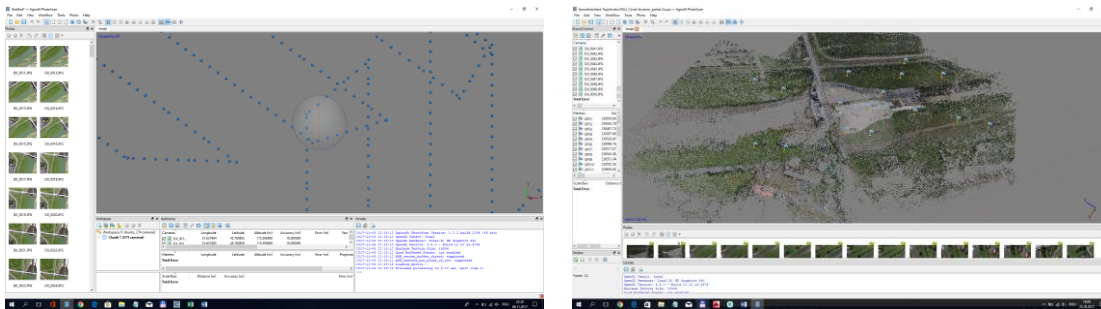
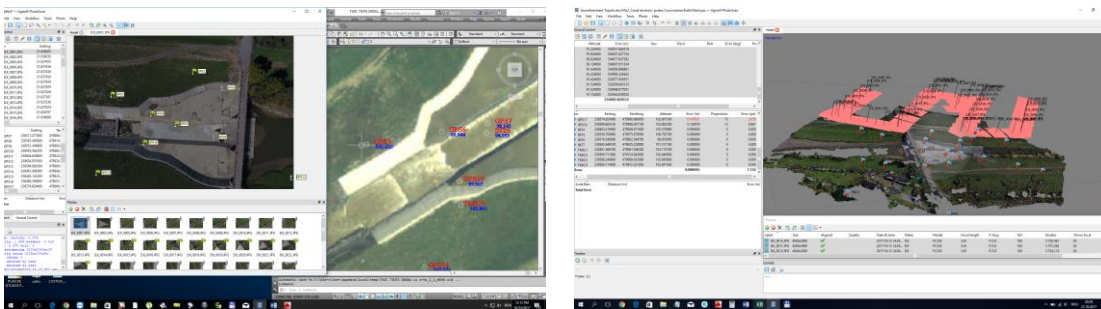Fig. 6 – Importing the aerial images in WGS 1984 coordinates



Fig. 7 – Control ground point presentation



Fig. 8 – Presentation of the point clouds

**5.** Mesh Representation (Construction Mesh) - PhotoScan reconstruction parameters support several reconstruction methods, which ultimately help to achieve optimal reconstruction for a particular set of data. The polygon contour (Polygon Count) specifies the maximum number of faces formed in the mesh. Additionally, the following advanced parameters can be adjusted: polygon type, namely high (Height) in our case we have a number of 32.119.727 points. If we had opted for a poorer generation of point clouds we would have: for the Medium module (Medium) a number of 16.119.058 points, for the low module (Low) a number of 2.832.594 points or it can opt for a custom module (Custom). The result of Mesh generation can be seen in Figure 7.

**6.** Creation of 3D model's texture (Building model texture) - texture mapping mode determines how the texture of the object will be wrapped in the texture atlas. The correct selection of the texture mapping mode helps to achieve an optimal texture packaging, in consequence, a better visual quality of the final pattern obtained. Textures mapping methods (Mapping mode) shall be taken into account, by texture generation parameters (Blending mode) and the text dimension and number size (Texture size/count). In addition, other parameters can be adjusted Advanced Parameters. In Figure 8 is presented the result obtained.

**7.** Building the faience pattern (Building Tiled Model) - Data hierarchy format is a good solution for urban scale modeling. Enables fast 3D viewing of high resolution of 3D models, an open sandstone model with Agisoft Viewer - a complementary tool included in the PhotoScan installation package. Data processing lasted 7 hours and 12 minutes.
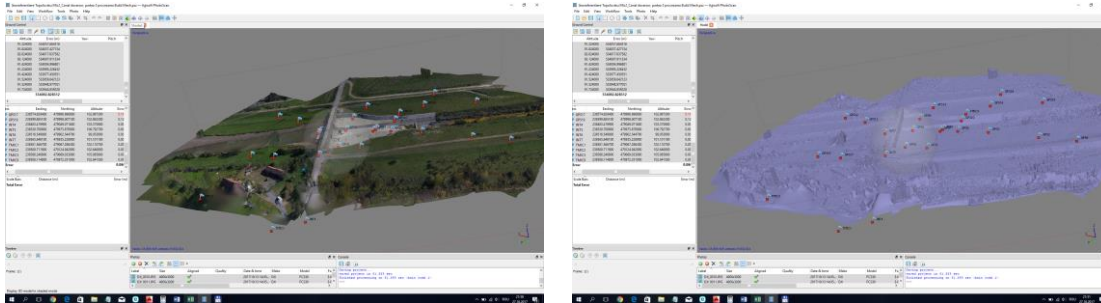
Fig. 9 – Obtain Mesh (Shaded to the Left and Solid to Right)

**8.** Making the Digital Elevation Model (DEM).

**9.** Obtaining Orthophotlan (Build Orthomosaic) based on aerial images and alignment of images on control points from the ground. In the continuation of the study, the newly obtained georeferenced Orthophotoplan (in 2018) was inserted in the AutoCad program where we compared the GPS data taken with the GSP Leica GS08 equipment (table 3), and then compared the new orthofotoplan with another older orthophotoplan from 2010, the results can be seen in Figure 9. Both Orthophotoplans are georeferenced in the Stereographic Projection System 1970 and superimposed over the GCP points taken from the GPS.

**10.** Final report of the paper covering all steps taken, the precisions, the images used, the number of control points, DEM, Mesh and the realization of the georeferencing.

| The pictures | X error | Y error | Z error | Error (m) | Error (pix) |
|---|---|---|---|---|---|
| GPS1 | -0,00082 | -0,05338 | -0,05578 | 0,086585 | 0,865 |
| GPS2 | 0 | 0 | 0 | 0 | 0 |
| GPS3 | 0,036718 | -0,01016 | -0,05006 | 0,066342 | 0,682 |
| GPS4 | 0 | 0 | 0 | 0 | 0 |
| GPS5 | 0,111514 | -0,10573 | -0,03657 | 0,166920 | 0,852 |
| GPS6 | -0,01769 | -0,05901 | -0,04148 | 0,051342 | 0,498 |
| GPS7 | -0,02703 | -0,05565 | 0,044331 | 0,089025 | 0,628 |
| GPS8 | 0,098082 | 0,206393 | 0,100105 | 0,294918 | 1,039 |
| GPS9 | 0 | 0 | 0 | 0 | 0 |
| GPS10 | 0,240903 | -0,05648 | -0,04699 | 0,284375 | 1,445 |
| GPS11 | -0,12949 | -0,1157 | -0,01983 | 0,143166 | 1,055 |
| GPS12 | -0,1046 | -0,04651 | -0,03665 | 0,101849 | 0,237 |
| GPS13 | -0,13328 | -0,11733 | -0,08312 | 0,169012 | 0,653 |
| GPS14 | -0,06569 | -0,00166 | 0,01723 | 0,057242 | 1,115 |
| GPS15 | 0,099543 | 0,055981 | 0,252045 | 0,529738 | 0,052 |
| GPS16 | -0,02441 | 0,050251 | -0,02056 | 0,048090 | 1,217 |
| GPS17 | 0,028593 | 0,170319 | 0,071616 | 0,197021 | 2,616 |
| GPS19 | -0,04183 | 0,071089 | 0,079123 | 0,12679 | 0,861 |
| **Total erori** | **0,041659** | **0,029480** | **0,042573** | **0,066461** | **0,607** |

Table 2Presenting the coordinates of GCP control points and their errors in AgiSoft PhotoScan for NH Topolovățu Mic
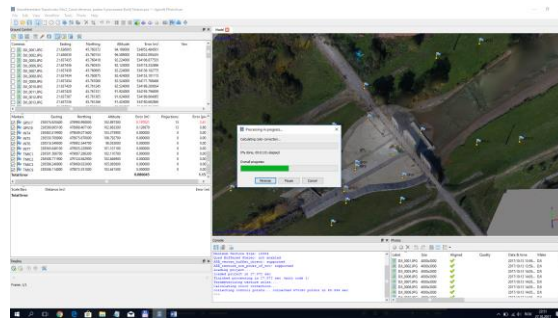


Fig. 10 – Carrying out the texture for the Topolovățu Mic Hydrotechnical Node



Ortofotoplan ANCPI - 2015



Ortofotoplan UAV - 2018

Fig. 11 Presentation of Orthophotlan obtained (right 2018, left 2010),
NH Topolovățu Mic, Timiș County

## Conclusions

In this study, photogrammetry data (273 images) were processed using AgiSoft PhotoScan making the georeferencing on the 19 GCP. The image analysis process for image generation includes image alignment, texture, geometry, Dense Point Cloud generation, construction and georeferencing.

In addition, this can be done with Open Source programs, namely: Bundler, PMVS, Pix4D Mapper, AgiSoft PhotoScan, Photosyntch or ARC3D. It is very essential to make an assessment of the accuracy and accuracy of the acquired data and as a result the final 3D model and geometry calculation.

This is particularly important for topographic models in which they successfully undergo modeling, carrying out volumetric calculations based on daytime sky clouds obtained from air flights. The total number of points-Points being 32.119.727, resulting a DEM of 8,196x5,180, and 8,28cm /pix.

The purpose of this work is to create a 3D database on the current state of the Hydrotechnical Node and on time monitoring, the realization of orthophotoplanes necessary for the realization of the heritage documentation as well as the realization of the situational plans based on the ground and air elevations for the design and renovation of the node.

This material presents the current presentation of the hydrotechnical node through the creation of geo-referenced orthophotoplanes and the point clouds can be used in conjunction with terrestrial laser scanning to complete the top of the constructions and to visualize in time the riverbeds.

**Keywords:** UAV, point cloud, ortofotoplan, AgiSoft PhotoScan, GCP, GNSS

## Aknowledgments

## Literature

AGISOFT PHOTOSCAN; Professional Edition Version 1.0.4.1847 64 bit; AgiSoft LLC: Petersburg, Russia, 2014.

ANDERS, N.; MASSELINK, R.; KEESSTRA, S.; SUOMALAINEN, J. HIGH-RES Digital Surface Modeling using Fixed-Wing UAV-based Photogrammetry. In Proceedings of the Geomorphometry 2013, Nanjing, China, 16–20 October 2013; pp. 2–5. View article

BARNES, G.; VOLKMANN, W. High-resolution mapping with unmanned aerial systems. Surv. Land Inf. Sci. 2015, 74, 5–13. Viewe article

BRUNO, F.; BRUNO, S.; DE SENSI, G.; LUCHI, M.L.; MANCUSO, S.; MUZZUPAPPA, M. From 3D reconstruction to virtual reality: A complete methodology for digital archaeological exhibition. J. Cult. Herit. 2010, 11, 42–49. View article

D. TURNER, A. LUCIEER, M. DE JONG, Time series analysis of landslide dynamics using an unmanned aerial vehicle (UAV), Remote Sens. 7 (2015) 1736–1757. View article

EL-HAKIM, S.; GONZO, L.; VOLTOLINI, F.; GIRARDI, S.; RIZZI, A.; REMONDINO, F.; WHITING, E. Detailed 3D modelling of castles. Int. J. Architect. Comput. 2007, 5, 199–220. View article

HERBEI MIHAI VALENTIN, COSMIN POPESCU, RADU BERTICI, ADRIAN SMULEAC, GEORGE POPESCU, Processing and use of satellite images in order to extract useful information in precision

agriculture, The 15 th International Symposium „Prospects for the 3 rd millennium agriculture" Cluj-Napoca, vol. 79, No. 2. Pg. 238-246. View article

KOH, L.P.; WICH, S.A. Dawn of drone ecology: Low-cost autonomous aerial vehicles for conservation. Trop. Conserv. Sci.2012, 5, 121–132. View article

LAURA ȘMULEAC, FLORIN IMBREA, IOANA CORODAN, ANIȘOARA IENCIU, ADRIAN ȘMULEAC, DAN MANEA, The influence of anthropic activity on somes river water quality, AgroLife Scientific Journal - Volume 6, Number 2, 2017 ISSN 2285-5718; ISSN CD-ROM 2285-5726; ISSN ONLINE 2286-0126; ISSN-L 2285-5718. View article

MAZA, I.; CABALLERO, F.; CAPITÁN, J.; MARTÍNEZ-DE-DIOS, J.R.; OLLERO, A. Experimental results in multi-UAV coordination for disaster management and civil security applications. J. Intell. Robot. Syst. Theory Appl. 2011, 61, 563–585. View article

NEX F. & REMONDINO F., UAV for 3D mapping applications: a review, Applied GEOMATICS, Vol. 6, Issue 1, 204, pp.1-15. View article

PAJARES, G. Overview and current status of remote sensing applications based on unmanned aerial vehicles (UAVs). Photogramm. Eng. Remote Sens. 2015, 81, 281–330. View article

REMONDINO F, SPERA MG, NOCERINO E, MENNA F, NEX F (2014). State of the art in high density image matching. The Photogrammetric Record 29: 144-166. View article

RUSNÁK, MILOŠ & SLÁDEK, JÁN & KIDOVA, ANNA & LEHOTSKÝ, MILAN. (2017). Template for high-resolution river landscape mapping using UAV technology. Measurement. 115. 10.1016/j.measurement.2017.10.023. View article

SMULEAC L., A. IENCIU, R. BERTICI, A. SMULEAC, D. DANIEL, Anthropogenic impact on groundwater quality in north-west Banat's plain, Romania, 17th International Multidisciplinary Scientific GeoConference SGEM 2017, Vienna GREEN Conference Proceedings, ISBN 978-619-7408-27-0 / ISSN 1314-2704, 27 - 29 November, 2017, Vol. 17, Issue 33, 35-42 pp; DOI: 10.5593/sgem2017H/33/S12.005. View article

ȘMULEAC A., C. POPESCU, F. IMBREA, G. POPESCU, L. SMULEAC, Topographic and cadastre works for the establishment of an animal farm with NPRD funds, measure 121, Varadia, Caras-Severin County, Romania, 16th International Multidisciplinary Scientific GeoConference SGEM 2016, Vienna, ISBN 978-619-7105-79-7 / ISSN 1314-2704, 2 - 5 November, 2016, Book 6 Vol. 3, 685-692pp, DOI: 10.5593/SGEM2016/HB63/S12.088. View article

ȘMULEAC A., I. NEMES, LAURA SMULEAC, IOANA A. CRETAN, NICOLETA S. NEMES, Comparisons between classic topographic measurements methods and LIDAR method on the corridor of 400 Kv power line, Parta-Sag sector, 17th International Multidisciplinary Scientific GeoConference SGEM 2017, 22 -31 August 2017, ISBN 978-619-7408-03-4 / ISSN 1314-2704, 29 June - 5 July, 2017, Vol. 17, Issue 23, 439-448 pp, DOI: 10.5593/sgem2017/23/S11.054. View article

ȘMULEAC A., I. NEMEȘ, IOANA ALINA CRETAN, NICOLETA SORINA NEMEȘ, LAURA ȘMULEAC, Comparative study of the volumetric methods calculation using GNSS measurements, 12-16 June, 2017 – Prague, Czech Republic, p. 57, IOP Conf. Series: Materials Science and Engineering 245 (2017) 052020 doi:10.1088/1757-899X/245/5/052020. View article

UYSAL M., TOPRAK A.S., POLAT N., 2015. DEM generation with UAV photogrammetry and accuracy analysis in Sahitler hill. Measurement, 73, 539-543. View article

# VILLAGES AND TOWNS IN BÉKÉS COUNTY

*Csaba SZABÓ*

National Chamber of Agricultural in Hungary; szabocsa92@gmail.com

## Introduction

Europe is facing serious social problems in the current era, not primarily about migration, but about the aging of European society and the serious problems of low growth rates and internal migration to big cities. Unfortunately, aging is not only affecting our villages, but also our cities and capital. According to some studies, Hungary's population may decline to 6 million by 2070, which is not unlikely in the light of current social indicators. (Monostori et al, 2018) A significant part of the population will be concentrated in the Budapest agglomeration, which will make the capital, which is sometimes burdened with environmental problems, less and less lively due to climate change. That is why it is important to emphasize the livelihood of rural towns and the swift, multifactorial, but primarily the promotion of the establishment of foreign artificial capital as soon as possible.

Békés County is one of the most disadvantaged areas of Hungary. If we want to demarcate our place in Europe, we have to say that it is a member of the European Union and, furthermore, belongs to the eastern, less developed bloc and is represented among the V4 countries besides Slovakia, the Czech Republic and Poland. Looking at its location within the country, it is one of the eastern counties bordering Romania, one of the most underdeveloped in the country, where we face infrastructure and serious social problems. The development of the road-system has already begun with the ongoing construction of the M44 motorway, and the development of Békéscsaba Airport and the construction of the M9 ring road may bring further positive results. From a regional point of view, it belongs to the Southern Great Plain region. At a glance, there are 75 settlements in the county, most of which are municipalities. The headquarters address is represented by Békéscsaba, and there are two other major cities, Gyula and Orosháza. The settlements are administratively delimited by 9 districts, which from 2013 will represent the basis of the administrative system again. We consider the location of agriculture to be the most important, since most of the country's best arable land is located here. In the north, the Körös flows, providing an opportunity for more diversified agriculture, which is not really exploited by the region.

## Literature review

According to Lengyel and Vas research, rural-urban settlements in Hungary show a diversified picture, with about one in two losing population and high unemployment, few significant businesses, and a very low number of graduates. These urban areas are gradually losing the factors necessary for development and dynamic driving forces. In terms of operating enterprises, personal income tax base and the proportion of registered unemployed, four types of settlement sets are drawn, using also the earlier results of the examination of urban micro-regions. These are Budapest and its catchment areas integrated with the global economy, settlements with processing industry (Győr, Székesfehérvár, Tatabánya, Szombathely, Kecskemét), settlement complexes with large

universities (Debrecen, Miskolc, Pécs, Szeged, Veszprém) producing for the domestic market. (Lengyel and Vas, 2015)

Beluszky and Sikos T. have previously carried out settlement typing analyzes for the whole country, in which they defined the structure of settlements in the given region according to 9 types. According to his analysis, the more urban area is mostly the northern part of the county, where the villages form small islands. However, most of the village population of Southern Tiszántúl is in the III. They have lost their agricultural character. Some villages still have a high proportion of outlying population, but their demographic processes have reduced them to small villages, such as Kardos and Örménykút. (Beluszky and Sikos 2007)

One KSH study on urban networking considered 10 key factors for categorizing municipal functions: population, services, hospitality, health care, social welfare, education, culture, administration, retention and attraction, economic potential. Each of the factors is assigned the most suitable indicators to describe that factor. After completing the complex index, the Hungarian cities were classified into 4 categories: capital, tertiary center, tertiary center, tertiary center. Small settlements were called villages and small villages. Based on their demarcation, the number of towns in Békés County is increasing, but in spite of this the population of all settlements decreased between 2001-2013. There are 20 secondary schools in Békéscsaba and Gyula. 44 from the village and 9 from the small village. (KSH, 2015)

Egri's study reveals how individual settlements measure themselves in relation to the average in terms of economic performance: if per capita income is above average, it is competitive; if it is below average, the given settlement is at a competitive disadvantage. Further categorization depends on how each factor behaves relative to the calculated mean. Accordingly, he classified both advantageous and disadvantaged settlements into one-factor, multi-factor and complex categories. In this way, he created 6 groups in which he divided the competitive disadvantaged and competitive municipalities into 3-3 groups. The majority of the settlements in Békés county belong to the two worst, namely the multi-factor disadvantageous and the complex disadvantaged parts. Not surprisingly, the settlements of Sarkad and South Békés also fell into these delimitation categories. It has three settlements which have a complex advantage, besides Békéscsaba and Gyula even Orosháza belongs here. (Egri 2014, Egri 2017)

In this article I explore the economic and social imbalances between the settlements of Békés County and systematize them with the help of selected indicators.

**Material and methods**

I request the data from the TEIR system for 2017, but there are also calculated indicators that I created by combining several non-specific ones. I typed the settlements of Békés county with a total of 19 indicators, among which there are good examples of the economic, social and infrastructure situation. I used IBM SPSS statistical data analysis software and ArcGIS software. The former for data evaluation and the latter for map rendering.

There was another research that helped, the so-called RePUS (Regional Policentric Urban System), which came from the INTERREG III B CADSES program, an European Union source. It was actually a city network research. This article defines

settlement types. The indicators they selected were: population, population change, gross value added, average labor productivity, ratio of persons employed in agro-industrial services, employment rate, active age population with tertiary and secondary education, combined accessibility indicator. (VÁTI, 2010)

After reading several articles on settlement typing, I conducted my analysis with the following indicators, which represent the settlements in economic, social and infrastructural aspects.

*Economic indicators:* per capita income, pre-tax profit, local business tax, number of registered businesses, primary income, number of persons employed in agriculture, number of small farmers

*Social indicators:* ratio of graduates, population density, number of dwellings needed, change in population (2007-2017), unemployment rate, proportion of gipsy population, old age index, net migration

*Infrastructure indicators:* distance from Budapest, distance from county seat, number of cars, number of internet users

*Factor analisys*

During my analysis, I performed factor analysis with IBM SPSS 20.0, which made it possible to make spatial comparisons. It is a frequently used tool in spatial structure research. "Factor analysis is not a single statistical procedure, but a generic term that refers to a set of multivariate statistical procedures. The method is used for data compression and data structure exploration, and it combines the number of initial variables into so-called factor variables that are not directly observable. "(Sajtos and Mitev, 2007) Factor analysis examines the relationships between several correlating variables. Often the variables that we can measure are not the variables that best describe the phenomenon we want to investigate. There are no independent and dependent variables specified in the analysis, but the purpose is to explore the relationship between the data.

Fábián clearly explains what the essence of factor analysis is, by looking for groups of original variables that are more closely correlated with each other, we consider these variables as belonging to a factor. If we succeed in separating such groups, the next task is to interpret the factors. This way, we can aggregate a large number of original variables into a number of factors and work on them as new variables. (Fábián, 2014)

*Cluster analisys*

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 so that the members of one group are close to each other along each variable and far from each other group, cluster. It follows from the definition that the key concept of cluster analysis is distance. Distance can be defined in Euclidean terms, but distance can also be measured by any association metric such that strong association means proximity and weak association means long distance. (Székelyi & Barna, 2004)

In my research I use cluster analysis to classify the data into 11 clusters so that they are grouped into homogeneous groups.

There are two types of cluster analysis, hierarchical and non-hierarchical, also known as the K-center method. According to László Péli, there are two important differences between the two methods. The hierarchical is much harder because it compares the

elements in pairs so it takes longer to complete. One difference is that for a non-hierarchical one, we need to specify the number of clusters. Another is that the center of the clusters does not have to be given to us, but can be calculated by the program. (Péli, 2013) The hierarchical name is intended to reflect the fact that the algorithm processes the clusters of a data set according to a hierarchical data structure. This data structure is usually a tree whose vertices are clusters. During the operation of a hierarchical algorithm, each iteration defines a new level in the tree. In a broader sense, the leaves of a tree are the data points, and the root of the tree is the cluster that contains all the data points. Intermediate, possible clusters are located at intermediate levels of the tree. (Iloncai, 2014)

In our case, we used Ward's method of aggregation, which is a variance method that calculates the average of all variables for each cluster and then determines the squared Euclidean distance for all units. The next step is to merge the two clusters with the smallest increase in the standard deviation. (Sajtos-Mitev, 2007)

**Results**

During the factor analysis 5 groups were formed:

**1.Density factor**

In this factor, 6 indicators are included, which shows that the higher the population density, the higher the number of people with higher education and the number of Internet users, and of course the direct income per capita and the opposite direction number of people employed in agriculture and population change.

**2.Poverty factor**

There are 4 factors in total. Thus, the lower the unemployment rate, the gipsy population and the closer to Budapest the lower the per capita income. Conversely, the number of cars is moving.

**3.Economic and society factor**

This factor primarily reflects the fact that where the number of old people is higher, the income from business tax, as well as the pre-tax profit and the number of cars, there is lower annual migration.

**4.Farmers factor**

The number of registered enterprises is in direct proportion to the incomes of primary producers and the number of small producers. There is a strong relationship between the indicators. Thus, as the incomes of small producers and primary producers increase, the number of enterprises increases.

**5.Travel factor**

The number of registered businesses depends primarily on the number of small producers and the incomes of the primary producers. Many smaller agricultural businesses are widespread in rural areas and generally operate as family farms with low incomes.

*Cluster analisys*

During the clustering I classified the settlements in Békés county into 11 groups, which I created based on the indicators of the above mentioned table.
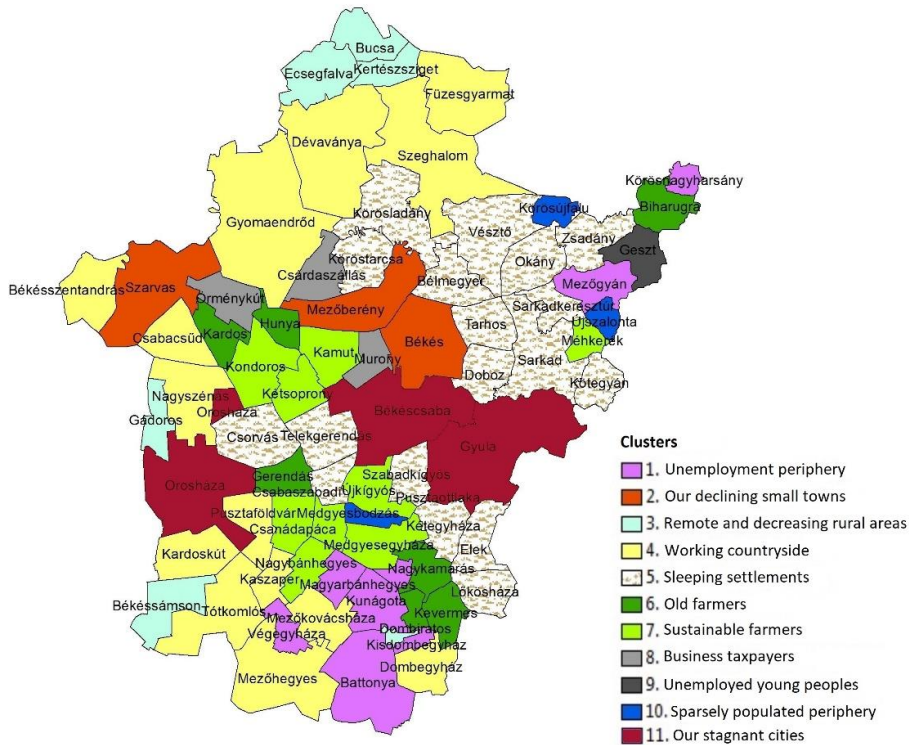
Figure 1. Cluster of Bekes county
(Source: Own editing, 2019)

#### 1. Unemployment periphery

In the first cluster there were 8 settlements, 1 of 8 small towns and the other villages. Aging is below the county average, but it is still bad, with around 150% of those over the age of 65 under 14. They are quite far from the county seat because it takes almost an hour to get there. He goes even further on Körösnagyharsány but also on Battonya. The proportion of people with tertiary education is low, as those with higher education are most likely to be located in cities. The number of emergency homes is above average, but getting to the motorway can be achieved in most villages within 1 hour. Population density is typically below average, coupled with below average employment, where unemployment is twice the county average. Characterized by the high proportion of those engaged in agriculture, around 24%, high incomes from primary production, and because they are low-income enterprises, the per capita income is also below average.

#### 2. Our declining small towns

The reason I called them "down" is because they, too, have significant social problems despite having better economic conditions. Three cities were included in the cluster:

Mezőberény, Békés and Szarvas. Mezőberény has the lowest population of 10,000. I would now like to address the problems mentioned above. Aging is high in these cities, except where the gipsy population is high, and migration and population change are also negative. The proportion of people with tertiary education is higher, around 17%. Since 2007, the total population decreased by 7.6%, but mainly in Mezőberény and Szarvas. The number of emergency homes is below average, but the number of internet users is well above 254. In terms of agricultural indicators, both the number of primary producers and those employed in agriculture are low.

3.<u>Remote and decreasing rural areas</u>

It is one of the youngest groups of settlements, although the number of gipsy is low, but it can also be attributed to the fact that in the census people can decide on ethnicity individually. The more distant counties are not only far from Budapest, but they are at least 62 minutes from the center of the county on average. There are big differences in motorway access. They are among the lowest in terms of business tax and there are municipalities where the municipality has, no such income. In terms of annual income per capita they are around the average, nevertheless the unemployment rate can be considered favorable, but also in the settlements with a larger city nearby, such as Gádoros-Orosháza or Békéssámson-Hódmezővásárhely. Negative migration is also very significant, ie the migration factor is pointing towards losing weight, which is also illustrated by the population change indicator for 2007-2017, which shows a decrease of around 10%. The number of Internet users is low, but the proportion of those employed in agriculture is high, reaching over 40%.

4.<u>Working countyside</u>

For several indicators, the data are around the average, such as the old age index, the proportion of graduates, the change in population between 2007 and 2017, and the number of new car owners. The gipsy population is low and migration is less significant, but it is also declining. There are several district headquarters, such as Gyomaendrőd, Mezőkovácsháza or Szeghalom. They are also more viable from an economic point of view, as they are well above the county average in terms of business tax. Füzesgyarmat, Mezőhegyes and Kardoskút stand out in this respect. Mezőhegyes and Kardoskút are similar in terms of per capita income, but Szeghalmom is also of outstanding value. In terms of unemployment figures, they are among the most employmented municipalities and cities, and they are barely below the county seat. Their migratory balance is also very low and even positive in Nagyszénás and Kardoskút. The internet is good, the proportion of those working in agriculture is lower than the average. I would like to highlight Mezőhegyes, where the agricultural employment is high but the incomes of the primary farmers are low, this can be attributed to the stud farm.

5.<u>Sleeping settlements</u>

One of the largest clusters, it comprises 18 municipalities. These can be said even as sleeping towns or villages, because they are close to the bigger towns, their distance from the county seat is short, only 28.9 minutes can be reached in Békéscsaba or one of the bigger towns like Gyula or Orosháza. The old age index and the number of emergency housing units are slightly below the county average. Population change is also around the average, but in many cases driving up the freeway can take up to one and a half hours. The proportion of the gipsy population is higher, but employment is

around the average, which is also due to the location of the settlements. In economic terms, income is close to the median, but business tax, pre-tax advances and the number of businesses are typically low. Agriculture is not one of the determining factors in this cluster.

6.Old farmers

The oldest settlements can be found here, such as Biharugra, Kardos, or Hunya, which has an extremely high value, with 354.7 elderly people per 100 children. This is a terribly bad value that does not provide much vision for the settlement. The number of emergency dwellings is high and the proportion of tertiary students is 1% lower than the county average, which is not negligible. Its population declined by 14.8% between 2007 and 2017, but Kardos fell by almost 20%. The settlements are also relatively disadvantaged in terms of migration balance, but the situation of Kardos is still the worst here. The gipsy population is low. In terms of economy, unemployment is medium, income per capita is very low, but corporate profit before tax is very high, almost one and a half times the county average. The nature of agriculture is well illustrated by the fact that the proportion of those employed in agriculture is close to 28%, the number of small farmers is high and the income from primary production is almost twice the county average, but the value of land rent is low.

7.Sustainable farmers

Settlements with relatively good economic, social and agricultural indicators were included here. Aging corresponds exactly to the county average, is close to the county seat and has a high proportion of people with higher education compared to other villages in the area. Migration was only negative, but positive in several villages in 2017, such as Csanádapáca, Kamut or Méhkerék. The share of emergency housing is below average and in terms of population decline, but the number of cars is high at 310 thousand. Its distance from Budapest is below average, and the gipsy population is only 0.8% of the population. On the economic side, local business tax revenues, per capita income and pre-tax profit are also well below average. The proportion of those employed in agriculture is high at 25.2% and the number of small farmers and small farmers is high.

8.Business taypayers

Along with aging, migration and weight loss are also very negative and, if they continue, may disappear within a few years. Csárdaszállás, Murony and Armen wells are here. The number of people with tertiary education is low, the business tax revenue and the pre-tax profit are also high, due to the low headcount and the high per capita amount. For example, in the case of the Armenian Well there are two big companies, such as the Szarvasi Agrár Zrt. or the Szarvasi Mozzarella. Looking at the satellite imagery, the sites of the two companies occupy a larger area than the village itself. Income is slightly above average and high in agriculture, but the number of primary producers is rather low, due to the fact that most people work for the local agricultural company.

9.Unemployed young peoples

Only one settlement, Geszt, came into the cluster. It is a young settlement, with only 74.7 retirees per 100 young people, but unfortunately this is not reflected in entrepreneurship and unemployment, nor in income. The proportion of the gipsy population is very high and the number of settlements is negligible, the number of small

producers is low, even the proportion of those working in agriculture is low. Economically one of the weakest in the county.

10.<u>Sparsely populated periphery</u>

Körösújfalu, Pusztaottlaka and Újszalon got here. They are aging, low in population, few intellectuals, and their population is in decline. They are far from Budapest, but also from the county seat. Economically, as if they were okay, but the situation was subtle. While the value of business tax and the number of registered businesses are high, per capita income, prime income and pre-tax profit are low, but one of the well-being indicators is the number of cars. They hardly use the internet. Nearly a fifth of the population works in agriculture. The number of emergency homes is high and unemployment is also higher than the average by 2%.

11.<u>Our stagnant cities</u>

There are 3 economic centers of the county here, it is clear that Békéscsaba has the highest population density. Society is aging and slowing down in all three cities, with a net migration rate of -2.1% in 2017. Obviously, the proportion of graduates is the highest here, thanks to large companies and hospitals. The number of cars and per capita income is high, but there are some interesting things here as well. In terms of income, Gyula is preceded by Orosháza, which is mainly due to Linamar and the glass factory, despite the fact that Gyula is more populated and has more tourist potential. Even with such a large population, even one or two major companies can influence income levels. Business tax revenues are high, but the number of businesses per 1,000 people is fraudulent, as the number of people here is much higher and, as a result, the number of companies may seem low. Agriculture is insignificant in the economic life of the municipalities, employment also accounts for only 5% and the incomes of primary producers are low. Unfortunately, highway access even in these larger cities is quite long this year, much more than 1

**Conclusions**

Based on the survey it can be said that the settlements of Békés county perform poorly both economically and socially. Unfortunately, the largest cities are also in decline and I have classified these settlements into 2 groups. One of them is Békéscsaba, Gyula and Orosháza, its population is shrinking and it is facing aging problems. The other was Békés, Szarvas and Mezőberény, where the aging of the society and the population is even greater. In addition, there are smaller towns, but they do not form a separate group, they do not differ economically and socially from villages and villages. It can be said that among our villages there are those who have unfavorable and even unfavorable conditions. Aging is amazing, for example, in Biharugra, Hunya or Armenian Fountain. But the annual migration balance also gives us data that is depressing. Mezőgyán, Örmenkút or Csabaszabadi have very poor conditions. In most of our villages, there is, no option other than agriculture, where it does not work, and there we have to prepare soon for it to disappear. Economic data is not always relevant, as in many cases the number of businesses, business tax or pre-tax advances greatly distorts the true sustainability of the settlement. In terms of infrastructure, there are villages that take up to an hour and a half to reach the county seat and the nearest motorway is more than 100 minutes away. It can be shown that settlements close to one of the larger cities have much less value. In Békés county, sleeping settlements were also formed, such as

Csorvás, Doboz or Kardoskút. The role of agriculture as a population retention force is devalued, and the young population no longer envisions its future in this. There is a concentration of land in the area and fewer people are engaged in farming. From my research, I came to the conclusion that there will soon be disappearing settlements, mainly due to the poor economic, infrastructural and social changes. Complex development of the region is inevitable, as otherwise there will be a serious decline in one of our countryside, which has one of the largest agricultural traditions.

## Summary

In my research I examined the settlements of Békés county from the economic, social and infrastructure aspects. Since I worked with many indicators, it was important to explore the relationships between the indicators, for which I used factor analysis. So I found out which metrics correlate with each other and which do not. I performed cluster analysis on the territorial units. The settlements were thus grouped into 11 homogeneous groups based on cluster distances. I analyzed them individually and plotted them on a map for easier overview, then drew my conclusions on the current situation of the settlements.

**Keywords**: settlement, decrease, migration, agricultural, desolation

## Literature

Beluszky Pál és Sikos T. Tamás (2007): Változó Falvaink, A magyarországi falvak típusai a harmadik évezred kezdetén. Tér és Társadalom 21. évf. 2007/3 1-29. p.

Egri Zoltán (2014): A város- és várostérség-tipizálás alapjai Kelet-Közép-Európában. (2014) TÉR ÉS TÁRSADALOM 28 (2): 87-104.

Egri Zoltán (2017): Települési egészségegyenlőtlenségek a gazdasági fejlettség triadikus felbontása alapján. Studia Mundi Economica Vol. 4. No. 3.(2017)

Egri Zoltán és Paraszt Márta (2013): Urbanizáció Kelet-Közép-Európában – A várostipológia kísérletei. Kézirat. Lukovics Miklós – Savanya Péter (szerk.) 2013:Új hangsúlyok a területi fejlődésben. JATEPress, Szeged, 79-98. o.

Fábián Gergely (2014): Alkalmazott kutatás módszertan: TÁMOP-4.1.2 A1, TÁMOP-4.1.2 A2

Iloncai Zsolt (2014): Klaszter-analízis és alkalmazásai, diplomamunka, 69 p.

https://webcache.googleusercontent.com/search?q=cache:5LNOW8EnjY8J:https://people.inf.elte.hu/fekete/al goritmusok_msc/klaszterezes/ket_szakdolgozat/Diplomamunka_IZs.pdf+&cd=1&hl=hu&ct=clnk&gl=h u&client=firefox-b-d

KSH (2015): Magyarország településhálózata 2. Városok és falvak. © Központi Statisztikai Hivatal, 2015, ISBN 978-963-235-477-4, ISSN 2064-8073

Lengyel Imre - Vas Zsófia (2012): Várostérségek eltérő fejlődési pályái Magyarországon In: A régió TÍZ próbája. Regionális Tudományi Társaság/Društvo za Regionalne Nauke, Szabadka, Szerbia, pp. 35-48. (2015) ISBN 978-86-86929-06-8

Monostori Judit, Őri Péter, Spéder Zsolt (2018): Demográfiai portré, ©KSH Népességtudományi Kutatóintézet ISSN 2061 3741, 295 p.

Péli László (2013): Növekedési pólusok főbb regionális gazdaságtani összefüggéseinek vizsgálata Magyarországon, Doktori értekezés

Sajtos László és Mitev Ariel (2007): SPSS kutatási és adatelemzési kézikönyv. Budapest: Alinea Kiadó, 402 p.

Székelyi Mária és Barna Ildikó (2004): Túlélőkészlet az SPSS-hez. Budapest: Typotex Kiadó. 453p

VÁTI (2010): Falu város régió. Területfejlesztési és területrendezési folyóirat, 21-27. o.

# AT THE PERIPHERY OF PERIPHERIES (BÉKÉS COUNTY)

*Zoltán EGRI – Magdolna MOLNÁRNÉ KRAJCSOVICZ*

Szent Istvan University Faculty of Agriculture and Economics, HU-5540 Szarvas, Szabadság sr. 1-3.,
egri.zoltan@gk.szie.hu

## Introduction

As far as either Békés county or its wider surrounding (i.e. Southern Great Plain) is concerned, these territorial units belong to poor competitiveness, lagging behind and/or low income convergence clubs being on the factor-driven phase regarding both domestic and European Union relations (Lengyel 2010, Rodríguez-Pose – Ketterer 2016). Similar to the other Visegrád Group countries east-westbound socio-economic division in Hungary is a phenomenon that dates back to centuries. Gorzelak (2006) associates this with the spread of Romanesque and Gothic style (i.e. cultural differences). Romanesque style represents the western influence, while Gothic culture transmits mainly oriental impacts. There is a transitional zone between these two cultural territories that has long been impacted by both sides. As regards of Hungary the western borderline of this zone is represented by the Danube. Considerable areas of the Hungarian Great Plain – including Békés county – has become peripheral from socio-economic and spatial aspects during the last century. Moreover, it has turned out to be the periphery of peripheries (Baranyi 2004).

## Literature

Due to its agricultural potential Békés county (together with the entire Great Hungarian Plain) has launched itself into a highly favourable position during the 19th century. Former flood control measures, infrastructural development as well as the reliable market conditions and external tariff protection of the Austro-Hungarian Empire led to the increase of income and development possibilities (Illés 2001, Győri-Mikle 2017). Based on the main development factors Békés was considered as one of the most advanced counties within the empire where the share of well-developed population was definitely high (Szilágyi 2018, Pénzes 2018). The Trianon peace treaty has become the main trigger for getting peripheralized. Losing the existing agricultural markets, isolation and tariff wars of surrounding countries as a result of protectionism and the subsequent international agricultural crisis has weakened, in great extent, the position of the Great Hungarian Plain (Illés, 2001). Baranyi (2004) justified this peripheralizing process of the region by two features (indicating spatial consequences as well): on the one hand, it was due to the proximity of the newly delineated country border. On the other hand, some of its natural catchment areas (e.g. Arad and Nagyvárad) were lost. The new situation induced this virtuous circle of collecting cumulative disadvantages in near-border areas (Bereczki 1989, Baranyi 2002). The socialist era partially re-valorised these areas. As a result, Békés county has reached a distinguished net agricultural exporter status within the CMEA. This result impacted relative domestic performance as well: per capita agricultural income was the highest in this county both in the 1960s and at the end of the 1970s (Csite-Németh 2008). However, performance achieved as regards of the sector's productivity (i.e. income of agricultural origin divided by the

number of agricultural employees) fell behind this top position (5th place in both above-mentioned periods) indicating extensive processes. The importance of industry has always been smaller in this county (Becsei, 1987). Although delayed socialist industry-development policy changed this situation, it could not considerably amplify it so as to equalise it is respect of other regions of the country (Enyedi 1996, Leszkó 2008).

Industrial development brought only lopsided successes in the county. More innovative activities of the given era (e.g. electronics, IT or ITC developments) were completely missing from the portfolio (Lengyel 2001, Leszkó 2008). Apart from industrialisation urbanisation has also been belated in Békés, in particular in the north-eastern and southern parts of the county. Moreover, the network of secondary schools was insufficient during the last years of socialism. The National Settlement Network Development Concept rather hindered urbanisation in the Great Plain while enhancing the existing centre-periphery anomalies (Tóth-Csatári 1983, Tóth 1987, Bereczki 1989). Settlements with low population were the losers of this process. Infrastructural and communal development levels (primary care, housing conditions and the existence of basic institutions) were extremely low. Modernisation efforts brought minimal results (Beluszky 1987, Lengyel-Baukó 1987, Leszkó 2008). Dispersed settlements of the so-called tanya type were threatened and consciously got rid of during the years of socialism (Nagy et al. 2016).

Due to the above processes socio-economic changes and globalisation trends caught Békés county unprepared, thus it could no or hardly keep up the pace in the global competition during the transition (Lengyel 2000). Transformation and socio-economic turn induced the former developmental differentiation as well as the increase of territorial disparities. Territorial distribution was characterised by the outstanding and concentrated development of the capital, by the advantage of the north-western region of the country, by the importance of settlement size and by the ever-increasing fragmentation of microregions (Illés 2001, Csite-Németh 2008, Pénzes 2014). Transformation made all the previous catch-up progress vanish regarding Békés county. As for the estimated per capita GDP Békés reached 89 percent of the country average in 1975. This value fell to 80 and 60 percent in 1994 and 2005, respectively. The latter figure represents today's performance, too (Nemes Nagy 2017).

Among the main reasons of segregation agricultural crisis severely impacted the area of the Great Plain during and after the transition. Collapse of cooperations, closing-downs, characteristics and consequences of privatisation (i.e. micro-fragmentation of estates/holdings), failure of food industry enterprises, reduction in bank loans, significant drought damages, small-scale farming and the breaking down of integrations all influenced Békés county in a negative way (Illés 2001, Enyedi 2001, Baukó et al. 2005). Disintegration of cooperations generated problems from both territorial and settlement-development aspects, since these units had taken part in building public institutions and road maintenance (Baukó et al. 2005). The role of agriculture in Békés is currently (based on data sets from 2016) of key importance in national level. The value of location quotient is 2.2 and 3.8 in case of employment and gross value-added, respectively. According to Csite and Németh (2008) agriculture-based renewal or strong dynamics cannot be observed in any Hungarian counties. Nevertheless, numerous agricultural and (associated) food industry "flagship" companies can be found among the TOP100 enterprises residing in the county (BMKIK, 2018). Based on the net

turnover the most significant participants are Gallicoop Zrt. (2nd place), Green-Divizió Kft. (8th place), Nemzeti Ménesbirtok és Tangazdaság Zrt. – National Stud Farm (14th place) and Gyulahús Kft. (15th place).

Industrial restructuring is primarily focused on the issue of control in Békés county. Considerable proportion of the industrial performance has been created by local units of external enterprises. These units did not have own market connections, nor they carried out own entrepreneurial activities. In many cases these units produced not finished goods, but only parts or other inputs for their parent factory (Simon 1988, Illés 2001, Leszkó 2008). (For instance, in Szeghalom facility of Csepel Automobile Factory or in Doboz unit of Budapest Stocking Factory. In case of the former facility more than 80% of those employed in industry were connected to enterprises residing in the capital.) At the beginning of the industrial transformation – for protecting central units – these premises were closed the earliest. Industrialisation-based territorial equalisation was called "virtual" by Enyedi (1996) in connection with the Great Hungarian Plain.

Both socialist agriculture and industry (i.e. glass production, food industry, textile industry, timber industry, brick and ceramics industry) were largely exposed to CMEA – and especially former Soviet – markets, thus their collapse had critical impact on the economy of Békés county (Illés, 2001). It is important to highlight the role of sugar factories having been among the largest employers in the county. At the time they were closed (Mezőhegyes in 1997 and Sarkad in 1998) unemployment became higher and other participants of the production line have been thrown into crisis, too (Baukó et al. 2005, Leszkó 2008).

Concentration of foreign investments is really low in Békés county. Its peripheral geographical position and poor accessibility, low innovation willingness, weak industry clusters and knowledge capital is/was not attractive for foreign direct investment (FDI). Recently only 0.54 percent of the Hungarian FDI enterprises are situated in Békés county, while their capital is 0.42 percent of the country total (Hungarian Central Statistical Office, HCSO 2019). At the same time certain specific regional industrial activities provided adequate bases for FDI. These units offer premises not exclusively in the county seat. Some of the examples are seed production in Szarvas (Corteva Agroscience) and in Murony (KWS Magyarország Kft.); machinery and automotive industry (Linamar Hungary Zrt., Orosháza), brick and ceramics industry (Tondach Magyarország Zrt.), glass production (Guardian Orosháza Kft.), printed matter (Marzek Kner Packaging Kft., Békéscsaba) and chemical industry (Henkel Magyarország Kft., Körösladány). Other important stakeholders are Hirschmann Car Communication Kft (communication equipment production) and Mondi Békéscsaba Kft. (plastic packaging production). These enterprises exert great influence on the economic performance of the county (Figure 1). Nevertheless, only three companies from Békés county are included in the TOP500 Hungarian enterprises. Ranked by the net turnover of the sales Linamar Hungary Kft. reached the 164th place; Gallicoop Zrt and Guardian Orosháza Kft. are 372nd and 447th, respectively (HVG 2018).

Figure 1: Enterprises with the highest net turnover in Békés county
Note: font sizes correspond to the net turnover of sales of the given company. Szarvas Vas- Fémipari Zrt. is currently undergoing a liquidation process.
Source: own editing based on BMKIK 2018 data

Out of all immobile natural resources not only the mainly excellent agricultural features provide economic raison d'être. Tourism-related natural resources also contribute considerably to the economic performance of Békés county. Natural values supplemented by cultural and culinary attractions make for example Gyula being in the transportation-geographic periphery one of the ten most favoured holiday destinations of Hungary (Glózik 2019).

It is also important to underline that being close to the borders do not provide significant impulse to the county – it means that not only situational, but also underdevelopment periphery can be observed parallelly. Border proximity impacts are spot-like (e.g. regarding tourism in case of Gyula). The weakest interactions appear in marginal rural areas (Pénzes-Papp 2018).

The most outstanding, long-term social problem is the constant decrease of population greatly exceeding country averages. From the time of the transition until today (from 1990 to 2016) Békés county have lost more than 72,000 people. (This number is higher than the total population of Békéscsaba). All districts are involved in this remarkable demographic erosion that is due to both natural population decline and migration (Kovács-Tagai 2019). Population number registered by the 2016 MicroCensus

222

(339,303) corresponds to the value measured around 1880 and 1890. Still existing migration involving active-age people has long traditions in this county. It is partly due to the forced restructuring of the socialist era (industry, agriculture, settlement network) (Bereczki 1989, Simon 2002, Leszkó 2008, Lőcsei et al. 2013).

## Summary

I have examined the development and inequality processes of a Hungarian county peripheralized 100 years ago territorially. As for today it has also been peripheralized from a socio-economic aspect, too. I observed the changes from the period of the transition until recently. Long-term perspective of the county is largely influenced by the historical factor connected primarily to the Trianon Peace Treaty. This issue has not been resolved even by the equalising socio-economic policy of the socialist era. After the change of regime the backwardness of Békés county has steadily increased.

Transportation-geographical peripherality of Békés county can partly be eased by the recently opened (but still not completely finished) M44 highway. However, questions arise about what kind of short- and long-time advantages can this connection to the network provide. Is it possible that it will enhance the so-called pumping effect (i.e. the leaking of resources) regarding the county? In this relation I hereby cite the words of György Enyedi from 2001 claiming that "the main weakness of declining regions today – following the loss of several generations – is not the lack of money, investment or infrastructure (these factors might only have initiated these declines), but the lack of people. The lack of those people able to participate in developments, initiate, enterprise and learn (Enyedi 2001, p 665)." According to the author this concept is fully adequate and applicable for the most parts of Békés county.

**Keywords:** Békés county, periphery, spatial transformation, socialism, change of regime

## Acknowledgments

## Literature

BARANYI, B. (2002): A társadalmi perifériaképződés történeti előzményei és következményei In CSATÁRI, B. (eds.): Területi konfliktusok és változásaik a periférián (Tanulmányok a perifériáról) pp.120-139., MTA-RKK ATI, Kecskemét.

BARANYI, B. (2004): Gondolatok a perifériaképződés történeti előzményeiről és következményeiről Tér és Társadalom, 18 (2): 1–21.

BAUKÓ, T. – GURZÓ, I. – SIMON, S. (2005): Békés megye élelmiszergazdasági és vidékfejlesztési pozíciói javításának lehetőségei az EU-csatlakozás idején Kutatási beszámoló, MTA-RKK ATI Békéscsabai Osztály, Békéscsaba.

BECSEI, J. (1987): Békés megye társadalmának területi képe 1930-ban In Simon, I. – Rakonczai, J. (eds.): Alföldi Tanulmányok 1987 XI. kötet pp.189-208., MTA-RKK AKCS, Békéscsaba.

BÉKÉS MEGYEI KERESKEDELMI ÉS IPARKAMARA (2018): TOP100 Békés Megye gazdasága 2018 Békés Megyei Kereskedelmi és Iparkamara, Békéscsaba. http://www.bmkik.hu/download.php?id=2569

BELUSZKY, P. (1987): Az 1984. évi közigazgatási területbeosztási reform és az Alföld térszerkezete In SIMON, I. – RAKONCZAI, J. (eds.): Alföldi Tanulmányok 1987 XI. kötet pp. 71-98., MTA-RKK AKCS, Békéscsaba.

BERECZKI, A. (1989): Békés megye gazdaságilag elmaradott térségei In SIMON, I. (eds.): Alföldi Tanulmányok 1989 XIII. kötet pp.169-184., MTA-RKK AKCS, Békéscsaba.

CSITE, A. – NÉMETH, N. (2008): Magyarország gazdasági térszerkezetének átalakulása a szocialista gazdaságpolitikai kiteljesedésétől napjainkig, pp.1-16. HBF Hungarikum – MTA-KTI. https://www.palyazat.gov.hu/download.php?objectId=8462

ENYEDI, GY. (1996): Regionális folyamatok Magyarországon az átmenet időszakában Hilscher Rezső Szociálpolitikai Egyesület, Budapest

ENYEDI, GY. (2001): Településformáló folyamatok Educatio 10 (4): 663–669.

GLÓZIK, K. (2019): Békés megye turizmusának elemzése 2008-2018 közötti időszakban Kézirat.

GORZELAK, G. (2006): Main Processes of Regional Development in Central and Eastern Europe after 1990 Regional Diversity and Local Development in Central and Eastern Europe International seminar, Warsaw 10 November 2006, előadás. http://www.oecd.org/dataoecd/58/41/37778478.pdf

GYŐRI, R. – MIKLE, GY. (2017): A fejlettség területi különbségeinek változása Magyarországon, 1910–2011 Tér és Társadalom 31 (3): 143-165.

HUNGARIAN CENTRAL STATISTICAL OFFICE, HCSO 2019 (2019): A külföldi közvetlen tőkebefektetéssel működő vállalkozások https://www.ksh.hu/docs/hun/xstadat/xstadat_eves/i_qpk016.html

HVG (2018): A TOP500 cégei megyénként. 70-71.o. 2018.Nov.8.-i szám.

ILLÉS, I. (2001): Az Alföld helyzetének és fejlődésének transznacionális tényező In CSATÁRI, B. (eds.): Alföldi Tanulmányok 2000-2001 XVIII. Kötet pp. 32-43. MTA-RKK ATI, Békéscsaba.

KOVÁCS, K. – TAGAI, G.: Zsugorodó vidéki térségek; a népességcsökkenés demográfiai és tágabb összefüggései In: FARKAS, J.Z. – KOVÁCS, A. D. – PERGER, É. – LENNERT, J. – HOYK, E. – GÉMES, T. (eds.): Alföldi Kaleidoszkóp A magyar vidék a XXI. században Tanulmányok a 70 éves Csatári Bálint köszöntésére, pp. 173-182. MTA KRTK RKI, Kecskemét.

LENGYEL I. – BAUKÓ, M. (1987): Az alapfokú ellátás területi különbségeinek vizsgálata Békés megyében In SIMON, I. – RAKONCZAI, J. (eds.): Alföldi Tanulmányok 1987 XI. kötet pp. 247-262., MTA-RKK AKCS, Békéscsaba

LENGYEL, I. (2001): Megjegyzések az alföldi régiók versenyképességének megítéléséhez In CSATÁRI, B. (eds.): Alföldi Tanulmányok 2000-2001 XVIII. Kötet pp. 64-89. MTA-RKK ATI, Békéscsaba.

LENGYEL, I. (2010): Regionális gazdaságfejlesztés: Versenyképesség, klaszterek és alulról szerveződő stratégiák Akadémiai Kiadó, Budapest.

LESZKÓ, L. (2008): Békés megye gazdaság- és ipartörténetének sajátosságai, eredményei a 19. század végétől a 20. század második feléig PhD értekezés Budapesti Műszaki és Gazdaságtudományi Egyetem Gazdaság- és Társadalomtudományi Kar Technika-, Mérnök- és Tudománytörténeti Doktori Iskola, Budapest.

LŐCSEI, H. – BUBLIK, B. – NYESTE, A. (2013): Magyarország régióinak társadalmi-gazdasági profilja MKIK GVI Kutatási Füzetek, Budapest.

NAGY, G. – DUDÁS, G. – BODNÁR, G. (2016): „Megfogyva bár...” Egy tanyafelmérés tanulságai Békés megyében Tér és Társadalom 30 (1): 93-111.

NEMES NAGY, J. (2017): Régiók, polarizálódás, centralizáció Comitatus: Önkormányzati Szemle XXV: tavasz: 3-13.

PÉNZES, J. – PAPP, I. (2018): Települési fejlődési pályák Magyarország határ menti térségeiben In: MOLNÁR, V. (eds.) Az elmélet és a gyakorlat találkozása a térinformatikában IX. : Theory meets practice in GIS, pp. 285-293. Debreceni Egyetemi Kiadó, Debrecen.

PÉNZES, J. (2014): Periférikus térségek lehatárolása – dilemmák és lehetőségek Didakt Kft., Debrecen.

PÉNZES, J. (2018): Fejlettségi különbségek és centrum-periféria viszonyok a történelmi Magyarországon Összehasonlító módszertani vizsgálat In DEMETER, G. – SZULOVSZKY, J. (eds.): Területi egyenlőtlenségek nyomában a történeti Magyarországon Módszerek és megközelítések, pp. 85-116. MTA BTK, DE Társadalomföldrajzi és Területfejlesztési Tanszék, SzuloPress Bt., Veszprém.

RODRÍGUEZ-POSE, A. – KETTERER, T. (2016): Institutional change and the development of lagging regions in Europe A study for the European Commission, Directorate-General Regional Policy https://az659834.vo.msecnd.net/eventsairwesteuprod/production-ersa-public/1a1b44496f22469194d50076e57fbbe4

SIMON, S. (2002): Az agrárium sajátos területi-társadalmi konfliktusai és problémái a perifériákon In CSATÁRI, B. (eds.): Területi konfliktusok és változásaik a periférián (Tanulmányok a perifériáról), pp. 93-119. MTA-RKK ATI, Kecskemét.

SZILÁGYI, ZS. (2018): A Kárpát-medence fejlettségi membránja (1910) A fogalomalkotás és a vizualizálás egy lehetséges módszertani megoldása, az eredmények kontextualizálási kísérlete In Demeter, G. – Szulovszky, J. (eds.): Területi egyenlőtlenségek nyomában a történeti Magyarországon Módszerek és megközelítések, pp. 47-85. MTA BTK, DE Társadalomföldrajzi és Területfejlesztési Tanszék, SzuloPress Bt., Veszprém.

TÓTH, J. – CSATÁRI, B. (1983): Az Alföld határmenti területeinek vizsgálata Területi Kutatások, 6: 78-92.

TÓTH, J. (1987): Az alföldi urbanizációs folyamat kutatásából adódó fontosabb megállapítások és következtetések. In SIMON, I. – RAKONCZAI, J. (eds.): Alföldi Tanulmányok 1987 XI. kötet pp.99-112., MTA-RKK AKCS, Békéscsaba.

# ORGANIZATIONAL COMMITTEE OF THE CONFERENCE

*CHAIRPERSON OF ORGANIZATIONAL COMMITTEE:*

Dr. Zoltán FUTÓ PhD, dean (SZIU FAES)


*MEMBERS OF ORGANIZATIONAL COMMITTEE:*

Dr. Tabita ADAMOV PhD, vice dean (USAMVBT FMRT)

Dr. h.c. Dr. habil. Károly BODNÁR PhD, college professor (SZIU FAES)

Prof. Dr. Ioan BRAD, dean (USAMVBT FMRT)

DR. Klára GLÓZIK PhD, college associate professor (SZIU FAES)

Prof. Dr. Florin IMBREA, dean (USAMVBT FA)

Dr. Attila RÁKÓCZI PhD, LECTURER (SZIU FAES)

Dr. Laura ŞMULEAC, PhD, vice dean (USAMVBT FA)


*SECRETARY OF CONFERENCE:*

Dr. Zoltán EGRI PhD, College Associate Professor (SZIU FAES)

# SCIENTIFIC COMMITTE OF THE CONFERENCE

Dr. Tabita ADAMOV (USAMVB, Timisoara, Romania)

Prof. Dr. Károly BODNÁR (SZIU FAES, Szarvas, Hungary)

Prof. Dr. Ioan BRAD (USAMVB, Timisoara, Romania)

Prof. Dr. Jacek DLUGOSZ (UTP, Bydgoszcz, Poland)

Dr. Zoltán EGRI (SZIU FAES, Szarvas, Hungary)

Dr. Andrea FEHÉR (USAMVB, Timisoara, Romania)

Dr. Zoltán FUTÓ (SZIU FAES, Szarvas, Hungary)

Dr. Klára GLÓZIK (SZIU FAES, Szarvas, Hungary)

Prof. Dr. Florin IMBREA (USAMVB, Timisoara, Romania)

Dr. Todor MARKOVIC (UNS, Novi Sad, Serbia)

Dr. Piotr PRUS (UTP, Bydgoszcz, Poland)

Dr. Attila RÁKÓCZI (SZIU FAES, Szarvas, Hungary)

Prof. Dr. Roman ROLBIECKI (UTP, Bydgoszcz, Poland)

Dr. Cosmin SALASAN (USAMVB, Timisoara, Romania)

Dr. Laura SMULEAC (USAMVB, Timisoara, Romania)

Prof. Dr. Tihomir ZORANOVIC (UNS, Novi Sad, Serbia)

# CONFERENCE CALL

**3rd International Scientific Conference on Rural Development entitled**
**"Digitization in Rural Spaces –Challenge and/or Opportunity?"**

**DATE: THURSDAY, 14 NOVEMBER, 2019**
**VENUE: SZENT ISTVÁN UNIVERSITY FACULTY OF AGRICULTURAL AND ECONOMIC STUDIES**
**ADDRESS: 5540 SZARVAS, SZABADSÁG STR. 1-3. HUNGARY**

Szent István University Faculty of Agricultural and Economic Studies, Institute of Agricultural Sciences and Rural Development (SZIU FAES), Hungary,
Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" from Timisoara Faculty of Agriculture and Faculty of Management and Rural Tourism, and
Hungarian Academy of Sciences Regional Committee in Szeged, Logistics Working Committee
in cooperation with the Government Office for Békés County, Hungarian Chamber of Agriculture Békés County Directorate and Hungarian Chamber of Hunters Branch of Békés County cordially invites You to

**3rd International Scientific Conference on Rural Development**
entitled
**"Digitization in Rural Spaces –Challenge and/or Opportunity?".**

**<u>The aim of the conference:</u>**
Infocommunication, digitization, automatization – these are standard calling words and phenomena in today's global economy. The Fourth Industrial Revolution creates new business model and jobs in all industries. But what do these dimensions mean for the European countryside? What will their impact be on the retention of rural population, employment, agricultural production, food economy and sustainable development?

The aim of the conference is to provide practitioners, creators of rural development and representatives of scientific

community with scientific tools and methods to practise common thinking and outline effective problem-solving methods.

## <u>Sessions of the conference:</u>

- Session in Agricultural Management, Agricultural Support and Employment 1st section
- Session in Agricultural Management, Agricultural Support and Employment 2nd section
- Infocommunication, digitization, automatization in rural spaces section
- Local resources section
- Poster section

**The official language of the Conference is English.**