



HUNGARIAN UNIVERSITY OF
AGRICULTURE AND LIFE SCIENCES



Rurality in Europe

5th International Scientific Conference on Rural Development

Conference Proceedings

Editor: Ferenc Arany



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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 5th 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*

SOCIAL SCIENCES SECTION

Monor district settlements' investigation by complex development index

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Abstract

This study is based on the calculation of the Complex Development Indicator (in the following: CDI). The 105/2015. (IV. 23.) "on the classification of beneficiary settlements" edict is the legal framework of the CDI. We did not use the same indicators included in the Regulations to examine the complex development of the settlements in Monor district, but following the principles of edict, we try to find new ways. Our indicators are not one-factor indicators we use two-factor rates and scissors because we try to reach a similar result with less indicators. After the literature review, we present the methodology of our research and the economical, geographical and infrastructural position of Monor district. Our research focuses on the classification of Monor district's according to urban-rural typology, ranking of development of the settlements and the directions of changes in the period 2015-2019. We also overview the main causes of demographic, economic, infrastructural processes that have been established in the district. After the presentation of results and the CDI ranking, we draw conclusions.

Keywords:

complex development index, rural development, Monor district, suburbanization, group indicators

Introduction

To these days, the concept of the rurality cannot be defined in an exact way. There are definitions in the public consciousness that starts from individual points of view and can therefore be understood as a subjective opinion. The most extreme example of this is the setting up of the Budapest-rural contrast pair, which carries the extremely rough simplification in itself, it says what is outside the capital, is all the rural and it means clear disadvantage. Of course, dozens of more sophisticated but equally subjective classifications has spread in the public. Monor district is a special area of Hungarian districts, because it is located on the border of Budapest's suburb. This is a high developed, and fast growing district, however there are zones with disadvantages. On the base of Complex Development Index calculation we try to explore the district's special features.

Literature review

Scientific life, politics, EU and national spatial development, budgeting, management, and many other professional activities all require and expect the usage a well-defined classification methodology supported by quantifiable factual data. It is based on the geographical units, that can be defined on the basis of the determining criteria and the relevant information related to it. The examination of territorial



Figure 1. Monor district's location in pest county

development also dates back a long term in Hungary (Faluvégi 2000). According to Oláh (2003), settlement development surveys based on objective calculations need to be updated annually for policy makers and settlement management bodies. Thanks to the efforts of national statistical offices and Eurostat, the quantity and quality of regional and other data from official statistics have significantly improved since 2010 (Brandmueller et al., 2017). The implementation of a systematic, spatial data collection covering the whole country is the recommended fact (Nemes Nagy, 2017). The accumulated information provides several uses for the presentation of the natural, economic and social situation of the regions (Kiss – Szalkai 2018, Kovács – Bodnár 2017, Valkó et al. 2017), for the formulation of strategic development directions. Most of the regional development resources should be concentrated in the beneficiary areas delimited on the basis of the defined methodology in order to reduce their social and economic backwardness (Szűcs, Káposzta, 2018). There are currently several methods for defining and delimiting the rural, starting from a one-factor population density data used by the EU to a complex development index, using the methods to delimit areas as clearly and precisely as possible (Cromartie, Bucholtz 2008). Defining rural concepts and their meaning is not a tautological activity. The accurately circumscribed concepts are important that means the same in every situation, and don't let misunderstandings. Nowadays this generally accepted scientifically valid concept is not available and it is currently could to assume that it is not necessarily possible to assign a precise, conceptual definition to the concept (Newby 1980, 1985). At all times the rural concept is a social construction, what it carries a set of meanings of discourses, objective contents and elements of legitimization of the concept. (Kovách, 2010) Definition of rurality, the objectives, and the disciplines could result, that for the discipline specialized concepts in different situations will be differently useful. (Racher et al. 2004). However, the definition of a rural area is not only a methodological problem, but also the effectiveness of rural policy and the rural policy system is depend on it (Szakál 1999). The scientific view points aim the delimitation the rural areas with cultural, geographical, economical

development also dates back a long term in Hungary (Faluvégi 2000). According to Oláh (2003), settlement development surveys based on objective calculations need to be updated annually for policy makers and settlement management bodies. Thanks to the efforts of national statistical offices and Eurostat, the quantity and

and social parameters, also this is the main cause of the different geographical units formation in the rural development (Maácz, 2001). The Hungarian scientific specialists newest researchs are agree with that theory states the rural as a spatial category is not delimitable, but the rural development as a scientific activity efforts must be made to establish a system that is as precise and coherent as possible. A clear spatial delimitation is complicated by the fact that the rural, in parallel with the definition of geographical parameters, also exists as a complex environmental system and even changes dynamically. (Kovács et. Al., 2015.)

Our work's target is to present Monor district's settlements, and examine them by complex development index, compare data with, the EU urban rural typology's data, and overview the district's development in the last five years.

Monor district is located in the geographical centre of Pest county. It is not the part of Budapest suburb, but it closely connected to the capital. In the Hungarian districts' CDI ranking Monor is high-developed. The transport network (the M 4 highway and the Budapest-Cegléd-Szolnok railway line crosses the city) as well as the employment structure (a significant part of the habitants commuting to work in Budapest) all strengthens the dependence. From a geographical point of view the district covers the nothern part of Great Plain and the southern sloaps of the Gödöllő hills. There is no relevant water-course, but numerous creek and irrigational channel located all over the district. On the territory of Gomba, Péteri, Pilis & Gyömrő there could to find few smaller stagnant water, are artificially designed. Many of the natural values are noteworthy. Including but not limited to few values need to say few words about the Gerje creek's source area, it is Middle Europe's greatest alder forest, and the loess walls with great bee-eater populations, and also the loessy, and marshy Natura 2000 areas, are stayed in original conditions. The highlightened built value is the Monor cellar village, with it's more than 900 cellars. The agriculture, industrie and the oil mining are increasing sector, MOL Plc. Has discovered significant oil fields, the extraction is still ongoing and expanding, several industrial parks, logistics centers and automotive supply plants, warehouses of retail chains, production of medical vaccines, and a large solar park have also been built. (Bazsik, Koncz 2021.)

Methodology

The database and methodology for measuring complex development entered into legal force on 23 april 2015, with the 105/2015. (IV. 23.) "on the classification of beneficiary settlements" edict. In the present study, we considered 13 indicators, forming three groups of indicators, which are demographic, economic, and infra-structural groups. Among other things, we decided on the present method because no data were available for several indicators at the settlement level. The indicators used are listed in the table below.

Table 1. the indicators of CDI

Indicators	Units of measurement
Demographical indicators	
1.1 Urban/rural index (population density)	capita/km ²
1.2 Ageing index	%
1.3 Dependency ratio	%
1.4 Natural reproduction indicator (thousandths)	‰
1.5 Migration balance	%
Economic indicators	
2.1 Income included in the annual consolidated PIT tax base per permanent resident	Ft
2.2 Proportion of high and low income earners	%
2.3 Unemployment rate	%
2.4 Number of jobseekers registered over 180 days as a percentage of all jobseekers	%
Infrastructural indicators	
3.1 Population per 100 dwellings (resident population)	capita
3.2 Utility scissors	%
3.3 Number of cars per 1000 permanent residents	pcs
3.4 Number of internet subscriptions per 1000 permanent residents	pcs

Results

Monor district is part of Pest county, the center city is Monor. It has a territory of 352.02 km², a population of 70,247 people and a population density of 199.55 capita/km². On 15th of July in 2013, three cities (Monor, Gyömrő and Pilis) and eight villages belonged to it, however, during the 2014 municipal elections, the village of Pánd was also attached to the district. There are five settlements' population density is over 200 capita/km², Péteri is 200,76 capita/km², Pilis is 248,22 capita/km², Monorierdő is 292,30 capita/km², Monor is 387,11 capita/km², Gyömrő is 715,84 capita/km². These settlements exceed the population limit, national 120 capita/km², in the same way the EU limit of 150 capita/km². Based on the population density data, the urban-rural typology of the settlements delimits the urban area along the route 4 and the surrounding rural zones. (CSO)

The rural settlements are Csévharaszt 40,41 capita/km², Vasad 58,22 capita/km², Káva 60,48 capita/km², Bénye 76,15 capita/km², Gomba 77,46 capita/km², Pánd 85,77 capita/km², és Nyáregyháza 117,28 fő/km² population density with. So these settlements are rural as under the EU regulation. According to the data and the EU's Urban-rural typology Monor is an intermediate area, because the proportion of rural inhabitants is 20,8%.

Table 2. Monor district's settlements territory and population

Settlement	Indicators			
	Territory of settlement (km ²)	inhabitants 2019. (ca-pita)	population density	Rank
Gyömrő	26,51	19243	725,88	1
Monor	46,79	18807	401,94	2
Monorierdő	15,07	4917	326,28	3
Pilis	47,35	12182	257,28	4
Péteri	11,89	2502	210,43	5
Nyáregyháza	32,01	3864	120,71	6
Pánd	22,21	1995	89,82	7
Gomba	39,71	3125	78,7	8
Bénye	16,52	1273	77,06	9
Káva	11,31	658	58,18	11
Vasad	33,41	1995	59,71	10
Káva	11,31	658	58,18	11
Csévharaszt	49,24	2053	41,69	12
Monor district	352,02	70246	199,55	

Monor is a leader district of the Hungarian districts. The particular population structure given by a NW-SE direction lane. In this zone are three cities and two villages. Approaching to Budapest the settlements' population density is increasing. Examining the pattern, we thought could be discovered the clear effect of two extremely strong influencing factors, in one hand the suburban in the other hand the main travel route's caused it. The Route 4 and the Cegléd-Szolnok main railway line affects population density's degree of concentration. On figure 2. map could be seen with red line the route 4's schematic trail, along the road the settlements' population density is significant higher than the district's other settlements.

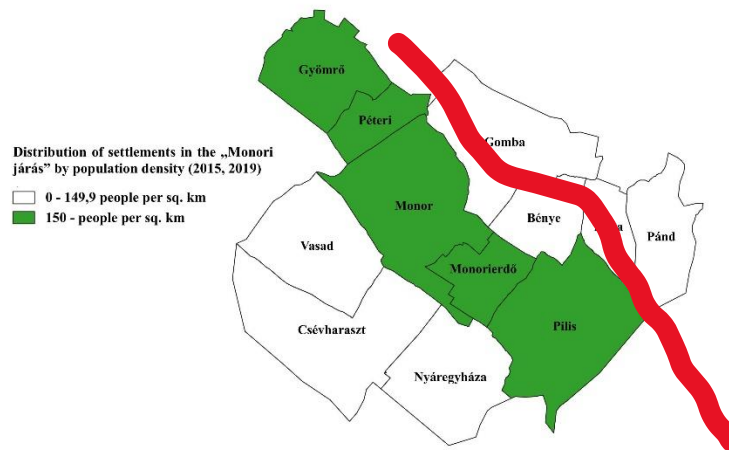


Figure2. Settlements' of Monor district's delimitation by urban-rural typology (2019)

On the basis of demographical group indicator could be seen the suburbia effect. It shows the relative order. Approaching Budapest, an increase in population density could also be observed. Those settlements, which are crossed by the main travel routes have equally high population density, but the demographical group indicator of CDI draws a lagging crescent with the settlements that are farther from Budapest, this pattern overdraws the main routes' „gravity” and shows up the suburb effect. The development ranking of Monor district divides the district into lanes, and projecting this further around Budapest, become visible the demographical ring zones as a typical map of the suburbs. This factor has powerfully influenced the population density, but - as you can see later - the population density has no direct effect on the state of development of settlements.

Table 3. The group indicators of Monor district's settlements

Település	Demographical group indicator		Economical group indicator		Infra-structural group indicator		Complex Development Index (CDI)	
	2015	2019	2015	2019	2015	2019	2015	2019
Bénye	27,69	20,79	76,78	69,56	27,90	38,40	44,12	42,92
Csévharaszt	37,93	34,09	60,63	67,97	69,03	61,58	55,86	54,55
Gomba	45,54	48,15	51,74	37,07	60,85	50,35	52,71	45,19
Gyömrő	69,15	78,09	73,45	93,41	88,83	58,90	77,14	76,80
Káva	31,63	14,57	34,65	48,87	13,08	23,24	26,45	28,89
Monor	49,98	46,87	55,32	59,39	79,64	63,31	61,65	56,53
Monorierdő	58,60	70,37	58,61	58,54	44,49	71,16	53,90	66,69
Nyáregyháza	42,88	37,99	27,99	42,12	48,53	38,46	39,80	39,52
Pánd	40,32	43,69	1,61	8,62	31,16	28,83	24,37	27,04
Péteri	72,38	73,97	48,16	45,06	87,95	72,22	69,50	63,75
Pilis	48,09	42,56	40,20	25,11	49,17	60,96	45,82	42,88
Vasad	54,39	50,61	49,70	61,10	52,67	47,79	52,25	53,17

In last five years the district settlements weren't too many dynamic changes. Only Monorierdő breaks in advance from 5th place to 2nd, because the infrastructural development was very powerful, others stepped one forward or one backward on the ranking. In year 2006. Monorierdő separated from Monor, and in the last 15 years the young village was able to hold up a continuous increase of development. In the last five years the infrastructural development was imposing in Monorierdő. It was the key that the village to jumping to 2nd place from 9th. Three settlements are long term lagged, these are Nyáregyháza, Káva and Pánd. Pánd has got problems with almost all the indicators, from 2015 to 2019 the demographical indicators did not changed significantly, however economical indicators have improved since 2015, but it is not enough for step up from the 12th place, and the infrastructural indicators are the same, only the internet subscribers were increased on a significant scale, at the same time it is enough for the 11th place only.

Table 4. Monor district's settlements' Complex Development Index

Település	Complex Development Index (CDI)		Rank	
	2015	2019	2015	2019
Bénye	44,12	42,92	9	8
Csévharaszt	55,86	54,55	4	5
Gomba	52,71	45,19	6	7
Gyömrő	77,14	76,80	1	1
Káva	26,45	28,89	11	11
Monor	61,65	56,53	3	4
Monorierdő	53,90	66,69	5	2

Nyáregyháza	39,80	39,52	10	10
Pánd	24,37	27,04	12	12
Péteri	69,50	63,75	2	3
Pilis	45,82	42,88	8	9
Vasad	52,25	53,17	7	6

In 2019 the ranking set up by KFM is lead by Gyömrő, Monorierdő and Péteri. These settlements are the highest developing settlements, followed by Monor, Csévharaszt and Vasad, these six settlements are the closest to Budapest. The weakest performing settlements in the eastern part of the district are located far away from the main traffic routes. Their disadvantage within the district can only be partly assumed on the basis of the examined data, but it can be perceived that the relatively large distance from Budapest in any case influences the population density and the composition of the population, which has an impact on economic performance and infrastructural development.

Between 2015 and 2019 the district's CDI pattern somewhat changed. in 2015. there were 7 settlements above the average development, for 2019. one village get below average, this is Gomba. With Gomba was well drawn the lagging crescent. in 2021. Monor -the 2nd greatest city- got out of the most developed category, and Monorierdő -the neighbour village- had became in the group instead. The lagging settlements are stable on the last 3 ranking. In case of Pánd as the base indicators same as the group indicators, hides complex problems. In 2019 the village is aging , the reproduction rate is -0,752 %, the migration balance is -0,352% so demographically is in bad conditions. Economical indicators are as bad as the previous factors the gross income is the lowest with 1.176.774;-Ft, the unemployment is the 2nd highest in the district, the proportion of high and low income earners is the lowest (42,8%).

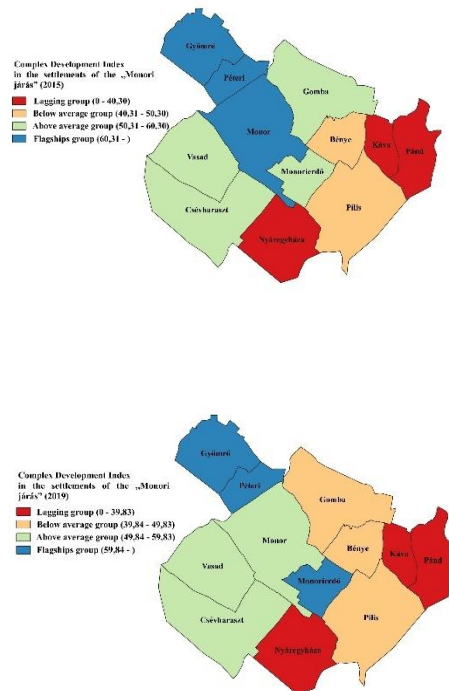


Figure 3. Monor district's complex development index 2015 and 2019.

In 2021, year opened the M4 main route, Üllő-Albertirsa section, this infrastructural development, could cause significant changes the current ranking in 3-5 years term, because the travelling time cutted with 15 minutes, so the most of the district's area got inside the 45 minutes boundary. This is the „psychological border” of Budapest suburb.

Conclusions

Monor district is located near Budapest, at the same time it is not the part of the capital's suburb, however the suburban effects experienced in developing datats of more settlements. By urban-rural typology Monor is an intermediate district, but it has got a very typical feature, the settlements' are laying next to Route 4 have high population density. By the Hungarian districts CDI ranking Monor is a high developed district, but the inner development is not equally. Eastern settlements are low developed, as demographical, as economical, same as the infrastructural conditions. Pánd is in the most critical situation. From 2015 to 2019 one city and one village got

in disadvantage these are Monor and Gomba, they weren't developed as fast as the others. The district is a fast developing area, and in the case of the settlements on the end of the ranking could experience a slow development too, so in this area is the last place also a developing position. Closer to Budapest could well feel the suburban effect, which is why Gyömrő, and Péteri are developing very fastly. Monorierdő is a young independent village, it is 15 years old only, but the detachment from Monor affected well for the development, so in the last five years Monorierdő jumped to the 2nd place from the 5th on the district's CDI ranking.

In the future is expected a significant rearrangement, because in 2021. opened the M4 main route, and the travelling time to Budapest decreased with 15 minutes, so all of the district's settlements will get inside the suburb travelling zone, and it could cause the high-educated people, with higher income and wealth are move here, and it could change the development processes.

Summary

To these days, the concept of the rurality cannot be defined in an exact way. There are definitions in the public consciousness that starts from individual points of view and can therefore be understood as a subjective opinion. Despite of all these, scientific life, politics, EU and national spatial development, budgeting, management, and many other professional activities all require and expect the usage a well-defined classification methodology supported by quantifiable factual data. There are currently several methods for defining and delimiting the rural and/or the state of development. On the basis of data of urban-rural typology's measurement we declare, by the EU's Urban-rural typology Monor is an intermediate area, because the proportion of rural habitants is 20,8%. On the basis of CDI's demographical group indicator could see the suburbia effect. On the basis of the CDI relative order, we can declare, approaching to Budapest, an increase in population density could also to observe. Those settlements, what does crossed by the main travel routes have higher population density than the others, but the demographical group indicator of CDI drawn a lagging crescent with the settlements that are farther from Budapest, this pattern overdraw the Main routes' „gravity” and shows up the suburb effect. Between 2015 and 2019 the district's CDI pattern somewhat changed. in 2015. there were 7 settlements above the average development, for 2019. one village get below average, this is Gomba. With Gomba was well-drawn the lagging crescent. in 2021. Monor -the 2nd greatest city- got out of the most developed category, and Monorierdő -the neighbour village- had become in the group instead. The lagging settlements are stable on the last 3 rankings. In 2021. year opened the M4 main route, Üllő-Albertirsa section, this infrastructural development, could cause significant change the current ranking in 3-5 years term, because the travelling time cutted with 15 minutes, so the most of the district's area got inside the 45 minutes boundary. This is the „psychological border” of Budapest suburb.

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Tourism development and land use dynamics in the shore zone of Lake Velence

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Abstract

Tourism development is a factor in rural regions for economic transition and economic growth. It is an efficient tool beneficial to community services and regional development. With the development of lake tourism growth and economic transition in the past 30 years, the land use and land cover of the nearshore are have changed to the new water-based tourism uses and varied land uses. In this paper, a lake tourism distinction in Hungary was chosen as the study site to examine the relations between lake tourism and the land use/land cover changes. The result shows that the tourism commendation area, tourism facilities area, and settlements increased significantly in the study period. Tourism development is the main factor that caused the loss of semi-natural land in the studied lakeshore. Besides, the northern and western shore zone is received less pressure due to the increased forests and semi-natural land.

1. Introduction

“water-related tourism” is defined as tourism in which the core attraction is water(Hall, Härkönen 2006). But, water-related tourism is not just about sailing and swimming. It is a combination of land uses and water uses. It also covers recreational activities, resorts, and second home tourism (Papageorgiou 2016). Some lake regions are popular because there provide opportunities for plentiful recreational activities, such as cycling and hiking, etc. Tourism development and waterfront regeneration as an effective tool are beneficial for the local economic growth and increase the amenity for the neighborhood communities. In the last decades, the growth of rural tourism in the lake region has widely arisen the potential of water-based recreations and lakeshore activities.

According to Doucet (2011), the most noticeable benefits of waterfront regenerations are providing opportunities for new land uses and activities. The improvement of transport and social service. However, This growth of visitors and development of constructions in the lakefront zone will result in ecological unbalance in the Lake and an increasing number of complaints about lakeside congestion (Smith, Puczko 2008). Papageorgiou (2016) stated that the water uses and infrastructure downgraded the visual quality of seascapes and landscapes. Water-based tourism often raises debates regarding the environmental impacts and conflicts with other human activities (Furgała-Selezniow et al. 2020). Several studies have examined the environmental and ecological impact of tourism and human activities on the fragile lakeshore and coastal zone, specifically discussing the impact of human activity on lake habitats and the ecological quality of the nearshore zone (Li et al. 2020; Pa-

pageorgiou 2016). Land use and land cover characteristics and the degree of variation are important measures metric of development process impact on the lakefront regions.

The objective of the present paper is to identify the land use and land cover changes in the context of lake tourism development and estimate the dynamic degree of the land-use change from 1989 to 2019 by a quantitative method. Finally, discuss the influence of lake tourism or water-related tourism on the shoreline and nearshore zone of Lake Velence.

2. Methods

2.1. Study area

Lake Velence is the second biggest natural lake and one of the popular tourist destinations in Hungary (*Figure1*), located 40 km away from Budapest. From the 1930s, Lake Velence has started the development of tourism. The convenience of the newly operated M7 highway and railway connections with the capital and Lake Balaton region boost the day-trip tourism in lake Velence since the 1960s. The lake region attracts a large number of tourists to visit and spend holidays in the summer season. It is a shallow lake with an average depth of 1.62m. The surface area of the lake is 24.17 km² (Szilágyi F., Szabó Sz. & Mándoki M. 1989). The open water area is 16 km², and the reeds take around 10 km² with stable and floating reed islands (Gábor 2016). On the western part of the lake is a nature conservation area of 4.2 km² belonging to the competence of Ramsar Convention, having an extraordinary landscape character with floating marshes and meadows. Along the southern and eastern shores of the lake, settlements were developed nearly continuously since the earlier of the 20th century (Boromisza et al. 2014). Affluent recreational areas and resorts around the lakeshore, especially the shore zone from Velence bay to Agárd. Since the 1960s, Lake Velence has undergone several major restoration projects. The investments and regeneration work carried in the shore zone of lake Velence are mainly to increase the tourism attractions and develop the recreational potentials.

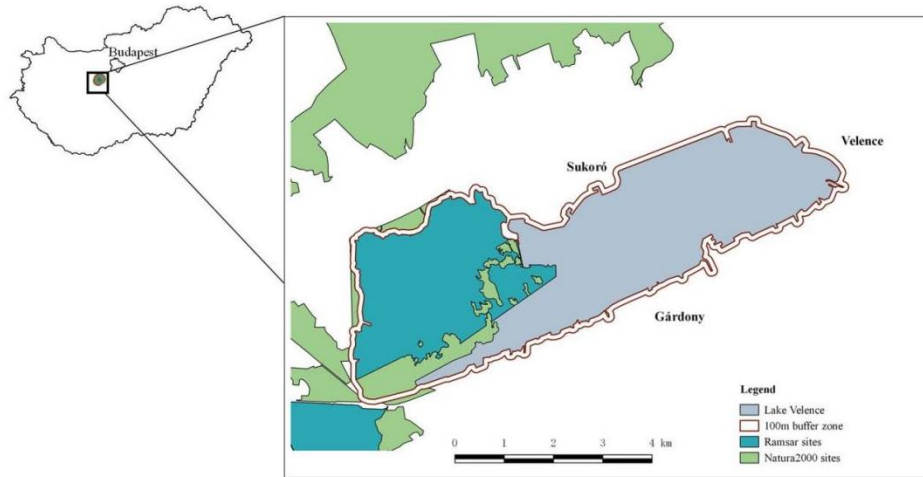


Figure 1. Study area

Table 1. Study Lake

	Waterfront strip area	Water surface area	Lakeshore length	Study period
Lake Velence	3.20 km ²	37.67 km ²	28.5 km	1986-2019

2.2 Data collection and geometric measurement

The 100-meter wide waterfront strip from the shoreline of Lake Velence was chosen as the study area, which is the most sensitive area for land uses and the lake ecosystem (Table 1). The total area of the analyzed pilot is around 3.20km². Create two vector layers in QGIS software separately representing the LU/LC in 1986 and 2019, and draw polygons to digitize the area of the LU/LC classes, all based on the orthophotos and topography maps scaled 1: 10000, and additionally referenced by the Bing aerial maps. The utilized base map and images resources are from a private collection of raster topography maps in 1986 and 30-meter high-definition ortho-images in 2019. Afterward, measure the area of digitized polygons and percentage of each land use category, and calculate the land use dynamic in the study period. All analysis is based on the QGIS 2.18 software and calculated in the WPS office Excel software.

2.3. Classification of land use / land use

According to the field survey and ancillary geographic information of lake Velence, we identified eight classes of land use and land cover generally (Table2). To analysis

the relationship between the land use/ land cover changes and the tourism development. We re-classified and integrated the eight categories of LU/LC into three main types of land use: Tourism development area, included the recreational area, accommodation areas, and other tourism facility area; Urban development area, which contains the settlement area and the transport land; Undeveloped area, this mainly refers to the vegetation-covered areas, like plantation areas, forests, semi-natural area, and rangeland.

Table 2 . LU/LC classification and description of each class

Main classes	Class	Description
Tourism development area	Tourist accommodation area	land occupied by hotels, summer houses, farm houses, resorts, second home.
	Recreational area	camping areas, beaches, parks, footpaths, fireplaces, sport fields
	Other tourist facility area	water management authorities, shipyards, shopping mall, land occupied by marinas, water equipment rentals, restaurants and catering facilities ,factory
Urban development area	Transportation land	main roads ,railways, parking areas
	Urban area	urban and town areas, group of residential buildings ,settlements.

		rangeland arable land, permanent crops, pastures and meadows (homogenous, intensively cultivated grasslands), heterogeneous agricultural areas	2.3.
	Agricultural land		
	Forests	forest land, forest composition, lands with tree canopy density > 50%	
Undeveloped area		wetlands, scrub, herbaceous vegetation associations, extensively cultivated biodiverse, semi-natural grasses, young woodland	
	Semi-natural area		

Land use dynamic degree and area variation rate

Land use dynamic degree as an important index of land-use change can be used to represent the annual variation rate of the land use type. According to the previous land use /land cover researches (Batar et al. 2017; Furgala-Selezniow et al. 2020), The dynamic degree of change for each class of LU/LC was modified and calculated by the formula described as:

$$q = \left(\frac{1}{t_2 - t_1} \right) \times \ln \left(\frac{A_2}{A_1} \right) \times 100\%$$

Where q is the dynamic degree of the land use /land cover, express the annual rate of the change for each class in the study area; A_1 and A_2 are the areas of land use/land cover type, respectively at the corresponding time t_1 (1986) and t_2 (2019). In addition, to examine the magnitude of the land-use area change in the study period, the area variation rate of land use has been considered, which calculated by the following formula:

$$C = \frac{A_2 - A_1}{A_1} \times 100\%$$

Where C describes the area variation rate of the land use between t_1 and t_2 , A_1 represents the area of the land use classes at t_1 , A_2 represents the area of the land use types at t_2 .

3.Results

3.1. Dynamics and area variation rate of land use in 1986-2019

Table3 shows that the condition of the land use /land cover of Lake Velence from the beginning time 1986 to 2019. In 1986, more than the half proportion of total lake shoreland was occurred by semi-natural land (55.23%), followed by 14.44 % of recreational area and 8.59% of forests. While the proportion of the semi-natural land has fall to 48.27%, the recreational area hardly changed to 14.36%, forest land has increased to12.73 % in 2019.

The most notable change of the land area of the LU/LC classes in the shore zone from 1986 to 2019 was the decline of the agricultural land, with -7.55% of a dynamic degree per year, and -97.13% of area variation rate. And the increase of tourism accommodation area ($q=1.6\%$, $C=69.39\%$) and other tourism facility area ($q=2.77\%$, $C=66.79\%$). Unexpectedly, although new beaches have been built along the lake, recreational activities and water sports facilities become richer, in fact, the total area of the recreational land has not obviously changed during the study period.

Figure2 indicated that the area of the tourism development area (tourism accommodation area, recreational area, tourism facility area, etc.)and urban development area (settlements and transport land) have separately increased 5% and 3% of the total area, but the undeveloped area (plantation areas and semi-natural land) has decreased 7% of the total area, between the 1980s to 2019.

Table 3. Changes of LU/LC in the period of 1986-2019

LU/LC Classe	1986	2019	Change of land use area between 1986 and 2019		Annual rate of change (q)	Area variation rate of land use (C)
			Area (ha)	%		
	% of the total area	% of the total area			%/year	%

Tourist accommodation area	2.80	4.74	6.21	1.94	1.60	69.39
Recreational area	14.55	14.36	-0.27	-	-0.02	-0.58
Other tourism facility area	4.15	6.92	8.87	2.77	1.55	66.79
Semi-natural area	55.23	48.27	-	-	-0.41	-
Transportation land	5.28	6.00	2.31	0.72	0.39	13.68
Urban area	4.10	6.51	7.7	2.41	1.40	58.69
Agricultural land	4.80	0.40	-	-	-7.55	-
Forest area	8.59	12.73	13.23	4.13	1.19	48.13

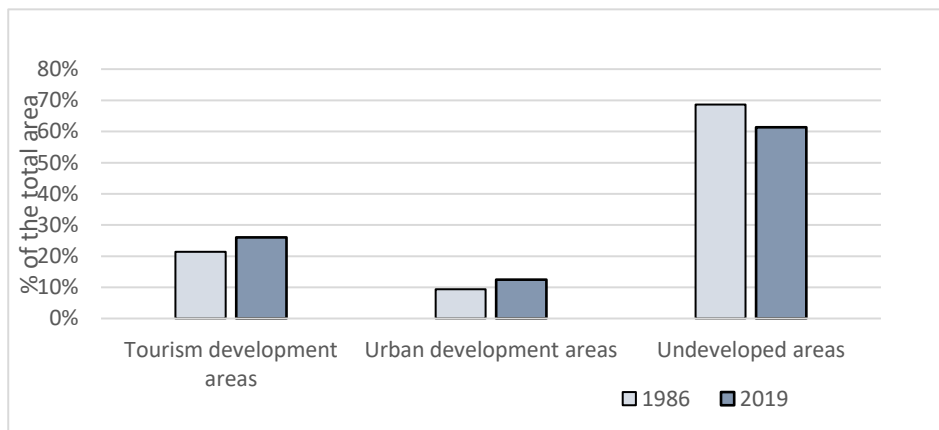


Figure 2. Variation of the main LU/LC classes

3.2. Changes in the shoreline and water surface

The nearshore water area of Lake Velence has changed in the period of 1986 to 2019 due to several times of renovation and protection projects. Shore infilling area and retreat area are mainly in the western natural conservation area (Figure3), with the infilling areas about 57.72ha in the nearshore zone and 31.77ha of retreated area. In addition, the infilling performance transforms the soil and sediments from the lake bottom or other areas of the lake, those activities also directly changed the shoreline of the Lake Velence(Figure4). The new infill areas are basically occupied by semi-natural land and habitats for birds and wild animals.

Figure 3. Shore infilling area and retreat area

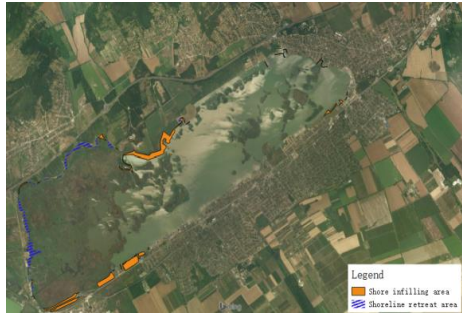


Figure 4. Changes of the the shoreline in the 1980s and 2019

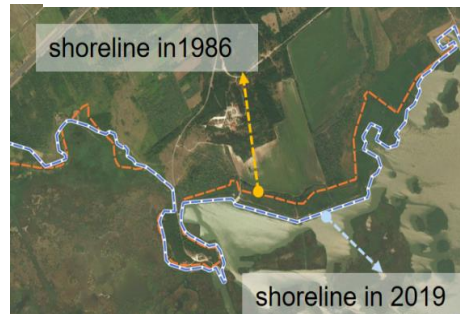
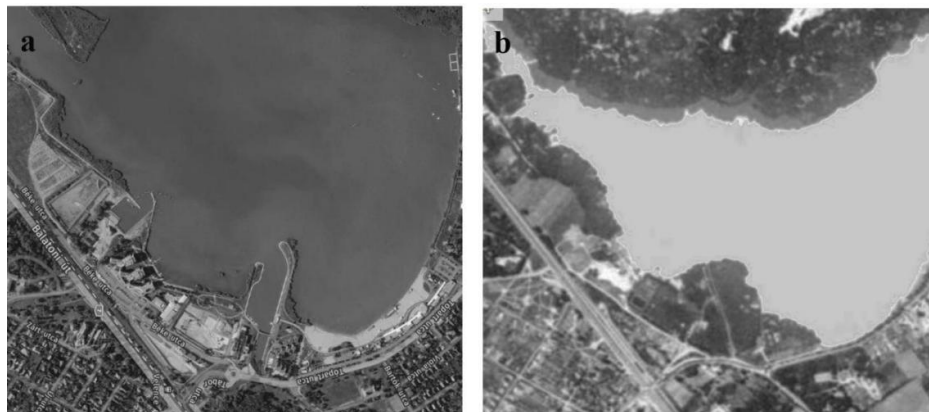


Figure 5. The comparison of velence bay in 1986 and 2019



note :a = Velence bay in 2019, b = Velence bay in 1986. The aerial images indicate the transform of semi natural land (b,1986) into a comprehensive tourism and commercial services area (a. 2019)

4. Discussion

The extensive land use forms were dominant in Lake Velence. 58% of the lakeshore are slightly pressured, 36% are highly pressured, 4% are pressured to a critical extend (Boromisza 2012). The use and conversion of lands are fundamental to tourism and can be directly linked to tourism development (Boavida-Portugal et al. 2016) The tourism services and commercial development in Lake Velence blossomed during the last decades. The tourism-related land use mainly appeared in the southern and eastern parts of the shore zone, particularly the expansion of recreational areas (artificial sand beaches, camping sites) and hotels. Changes in land use /land cover

on the northern shore zone are mainly reflected in the alteration of part of semi-natural land by forests and young forests. Grażyna (2020) has stated that afforestation is a most meaningful positive change in the shore zone of the lake region, additional reformation of building area into other forms of LU/LC are also beneficial to the lake environment.

Lake Velence is a popular summer tourism destination for swimming and bathing, and the majority of the tourists prefer a day trip route to visit the lake because of the near distance from Budapest. Even though the tourist's number was declined significantly since the 1990s (Gábor 2016) accommodations and resorts building are still the glories from 1986 to 2019. The trend of investing in a second home along the lake and surrounding areas is also an important driving factor that leads to the increase of tourism accommodation areas.

The water-based tourism and tourism-oriented development of lake Velence stimulated the growth of recreations and economic income of the local community, especially the tourism infrastructure and the tourism accommodations (resorts, hostels, second homes) located on the nearshore zone have prospered in the decades. Nowadays, the construction of infrastructures and tourism facilities are still widening, and the development of water-based sports facilities and new piers are continuously progressing. According to the initial complex reconstruction plans launched in 2016 by the national water management authorities, and expected to finish at the end of 2021, the regeneration framework on the shore zone includes walkways renewal, new cycling lanes, and establishing beach areas along the lake. Some of the plots along the southern shore zone are now under construction status, other semi-natural lands in the northern shore zone are now on sales status. Therefore, the trends of tourism-oriented land-use dynamics in lake Velence will continue to increase shortly. Furthermore, it is worth mentioning that the intensive land uses and excessive human activities may bring multi-pressures to the lakeshore and result in impaired habitats quality and degraded shores.

Lake aquatic ecosystems are fragile, notably the current water level and water quality crisis in Lake Velence. Although there is no direct evidence of a link between water level conditions and tourism development in Lake Velence. We cannot ignore the impact of tourism activities on coastal areas and waters. We have not discussed the tourism impacts on the water area more in-depth in the current paper, further analysis and discussion on the water surface and aquatic plant cover are required in the future study. Habitats and natural green spaces also are affected by the fragmentation of neighboring construction areas (Boavida-Portugal et al., 2016). We can not ignore the influence of tourism activities on the nearshore area and water. Large construction projects and building areas are the main threaten to Lake Velence. Planning policies about the land use on the shore zone of lake Velence ought to be cautious, especially the near water buffer zone, and it is essential to raise awareness on more sectors of the ecosystem services and sustainable tourism.

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The exercise of Hungarian agriculture on population change through the area-based aid system in 2017

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Introduction

With Hungary's accession to the European Union in 2004, significant resources were opened up for the country from the Common Agricultural Policy budget. In order to facilitate accession to the Union, the SAPARD Accession Program provided assistance in the development of the institutional system that provided the opportunity to mobilize resources for sustainable agriculture and rural development. The agricultural policy of the community can be defined along several objectives. One of the priorities is to preserve the rural way of life and living space and to ensure a fair standard of living for farmers. In addition to producing food of the right quality and from a reliable source, it is important to protect the environment and promote an effective response to global climate change. There are two pillars of the Common Agricultural Policy, one of which is the European Agricultural Guarantee Fund, from which the source of direct payments comes. The resources that can be applied for on such a territorial basis are the area-based support and the environmental protection component known as Greening. These are a form of income replacement support for farmers and encourage the spread of environmentally friendly forms of farming.

Area-based or SAPS support and Greening are also available for land users with a total area of at least 1 hectare. The Hungarian State Treasury publishes the data for 5 years as our claimant. We examined the year 2017, and the clarification of the large amount of data set of more than 400 thousand units was a bit of a hassle, as the names of the part of the settlement were often highlighted when delimiting the settlements. Each farmer receives the amount of support on 3 items. Area Aid, Greening and Retention for Financial Discipline. More than 180 thousand applicants and almost all settlements submit applications for support. Data were aggregated to district level for better visibility, and then spatial autocorrelation analysis was performed to explore neighborhood conditions. As well as linear regression and quartile analysis to explore the correlations between EAGF resources, incomes and population change.

1. Supply security goal
2. Food policy objective
3. Income policy goal
4. The goal of agricultural modernization
5. Market stabilization goal

To achieve these goals, co-financing institutions have been set up, focusing on direct payments, market measures and the payment of rural development funds. The European Agricultural Guidance and Guarantee Fund was set up in 1962 to finance the Community's agricultural policy objectives separately but from another fund. From 2007, the CAP has basically disintegrated into two pillars, one for the European Agricultural Guarantee Fund and the other for the European Agricultural Fund for Rural Development. The former finances direct payments and market measures, while the latter finances rural development programs. If we look at the proportion of money spent on the CAP, it was still virtually 80% of the EU budget after its creation, which has now fallen significantly, to just over a third. The framework for market regulation and rural development has fallen the most, and the budget for the Structural and Cohesion Funds has risen. (Halmai, 2020)

The European Union is often criticized for its strong, interventionist agricultural policy, but a study by Paul F. Donald found that the CAP has several advantages that justify its existence and maintenance (Donald, 2002):

- Facilitating EU enlargement
- Enables the EU to meet its obligations to international trading partners through the GATT and the WTO
- Significantly reduces the cost of producing, transporting, storing and disposing of agricultural surplus;
- Significantly reduces the external costs of modern agriculture
- Maintaining employment in rural communities, especially in the accession countries
- Reduce farmland abandonment in Europe
- Assist signatories in fulfilling their obligations under the 1992 CBD
- Promotes the protection of biodiversity in the candidate countries and reverses the damage to biodiversity in the current EU Member States

The main reason for setting up the area aid scheme is that the European Economic Community has pursued a strong interventionist market and pricing policy, which has led to unrealistically high prices within the Community. Unfortunately, this was not sustainable, so in 1992 the MacSharry reform separated price and income policy, which had several elements such as reducing agricultural prices, introducing direct subsidies and regulating production, supporting the situation of small producers, supporting extensive production, the introduction of set-aside, the protection of the natural environment and the reorientation of Community funding sources. (Székely, 2010) Then in 2003, during the mid-term review of the 2000-2006 cycle, the Single Payment Scheme (SPS) was introduced, which created an opportunity to take into account the differences and conditions between the Member States. Within these, three models were developed, one historical, which was the sum of the average subsidies received in previous years. The second is the regional model, where member

states could decide which region would receive how much. There was another hybrid version that evolved from a combination of historical and regional. From 2004 onwards, the number of Member States with access to the CAP increased with the accession of Hungary and 9 other countries, as they had no historical background and could therefore apply the Single Area Payment Scheme (SAPS) for a transitional period. (European Commission, 2016)

Nevertheless, it can be observed that the increasingly strong, environmentally conscious way of thinking in the European Union, which intensified further in 2014, with the introduction of the so-called Green Component for direct payments. Area payments, ie SAPS, could remain in Hungary in its old form until 2014, when another reform reduced the envelope for SAPS, but created an item called Greening, ie the greening component, which gave it one hectare in the previous cycle. amount has become available. It consisted of three elements, one is the preservation of permanent grasslands, the other is diversification, i.e. how many crops you have to sow depending on the size of the area. Furthermore, designating an ecological focus area above 15 hectares can be accomplished in a number of ways. (Was, 2014)

Thus, the years 2014-2020 were determined by SAPS + Greening in terms of direct payments to farmers. Member States also had the option of using other support, such as the small-scale support scheme for the smallest, or start-up support for young farmers and coupled crop and animal payments. The latter could not account for more than 5% of the national envelope in order not to cause overproduction. In a nutshell, the post-2020 cycle will be about further strengthening sustainability and green farming, which are called eco-schemes and will work in a similar way to agri-environmental support under the Rural Development Program, ie it will be optional. Support for farm transfers to young farmers will be strengthened.

Material and methodology

I requested the data of the indicators used in the research from Teir and the Hungarian State Treasury, where they are published as claimants of direct grants and within them by title. It was quite a bit of a hassle to clarify the data, as in many cases not a settlement but a part of a settlement was given, so the whole data table had to be reviewed. There were more than 400 thousand data, which I aggregated first into settlement and then into district level. The analysis was performed at the district level, so a total of 174 territorial units were involved, except for Budapest. I worked with data for 2017, of which I summarized and looked at 3 items, SAPS, greening and the smallholder support scheme. These components also included pre-2014 SAPS support. The indicators I have created are EAGF / 1000 persons (applicant), which consists of the 3 items mentioned above, Number of applicants / 1000 persons (resident population), Primary producer income / 1000 persons (primary producer), Population change% (2015-2017) and the proportion of people employed

in Agriculture, which were analyzed by linear regression, correlation, quartile, and spatial autocorrelation analysis.

Linear regression examines the linear relationship between a dependent and an independent variable, if there is a relationship, as indicated by the significance value of the F-test. The strength of the relationship is shown by the coefficient of determination, the closer it is to 1, the stronger the relationship. (Székelyi-Barna, 2008)

Quartiles, also known as quadrants, divide a data set into four equal parts. That is, a data set has four quartiles: bottom, bottom-middle, top-middle, and top. These should be analyzed for variables on a scale or interval measurement level. The lower quartile is the value below which 25% of the values of the population are located. The lower-middle quartile is the value in which the values recorded by 25-50% of the population are found. The upper middle, where the values between 50-75% are located. And the upper quartile is the value below which 75% of the values of the population are found. (Spssabc, 2020)

Territorial car correlation analysis is about exploring neighborhood relations, which is one of the foundations of spatial research. There are two types, one is local and the other is global. In performing the analysis, we used the Local Moran I statistics and within that the queen neighborhood, which shows the correlation of the areas bordering the given territorial unit. Based on the neighborhood relations, there are 4 types of relations: (Tóth-Nagy, 2013)

- High-High: Area units with a high value, for which the neighborhood also has a high value.
- High-Low: Area units with a high value for which the neighborhood has a low value.
- Low-Low: Area units with a low value, where the neighborhood also has a low value.
- Low-High: Area units with a low value for which the neighborhood has a high value.

Results

Linear regression analysis

The strength of the regression is shown by the value of the correlation coefficient (R), so the strength of the relationship within the indicator pairs can be said to be medium, while the Population Change% -EMGA / 1000 persons and Population Change% - Only weak for EAGF / 1000 people. R Square is the coefficient of determination, which is the explanation for the whole standard deviation, that is, how much the independent variable affects the dependent. Thus, in the case of population change% -EMGA / 1000 people, EAGF / 1000 people played only 1.9%. The number of Applicants / 1000 people 5.2%, the Primary Producer's income / 1000 people 0.7%, while the Farmer. occupy rate of 11.9%. The Std. Error of the Esitmate

shows the standard error of the estimate, the lower the better, here it can be said to be low in all cases.

Table 1: Model aggregation

Indicator	R	R Square	Adjusted R Square	Std. Error of the Estimate	
Population change% -EMGA / 1000 people	0,138	0,019	3,012	3,012	
Population change% - Number of applicants / 1000 people	0,228	0,052	0,46	2,961	
Population change% - Primary producer income / 1000 persons	0,083	0,007	0,001	3,030	
Population change% - Farm. occupy rate	0,346	0,119	0,114	2,854	

(Source: Own edition, 2021)

The significance level of the F-test in the ANOVA table shows how reliable the study is, as well as the standard deviation and within that the Regression and Residual values. In two cases, the significance value is acceptable, ie the change in Population Change - Number of Applicants / 1000 and the Percentage Change in Agriculture - as in these cases the significance value of the F-test is below 0.05 and the correlation value is only medium. scrub the bottom of values, we can state that other factors also have an effect on population change. For the other two indicators, no relationship can be detected.

Table 2

Indicator		Sum of Square	df	Mean Square	F	Sig.
Population change% - EMGA / 1000 people	Regression	30,366	1	30,366	3,348	0,069
	Residual	1560,253	172	9,071		
	Total	1590,619	173			
Population change% - Number of applicants / 1000 people	Regression	82,561	1	82,561	9,416	0,002
	Residual	1508,058	172	8,768		
	Total	1590,619	173			

Population change% - Primary producer income / 1000 persons	Reg-ression	11,082	1	11,082	1,207	0,274
	Residual	1579,537	172	9,183		
	Total	1590,619	173			
Population change% - Farm. occupy rate	Reg-ression	189,961	1	189,961	23,327	0,000
	Residual	1400,658	172	8,143		
	Total	1590,619	173			

(Source: My Edit, 2021)

The graphs below show the evolution of the regression line for the four pairs of indicators. The value of population change does not start from zero because it shows a decrease or increase compared to 100%. It shows a declining population below 100 and an increasing population above 100. There is no clear linear line in either case except for the proportion employed in Agriculture, as a slight negative correlation can be seen here. That is, where population change is high, that is, the population has increased, the proportion of people employed in agriculture is low. If we look at the other coordinate systems, the scatter of the data falls far from the linear line.

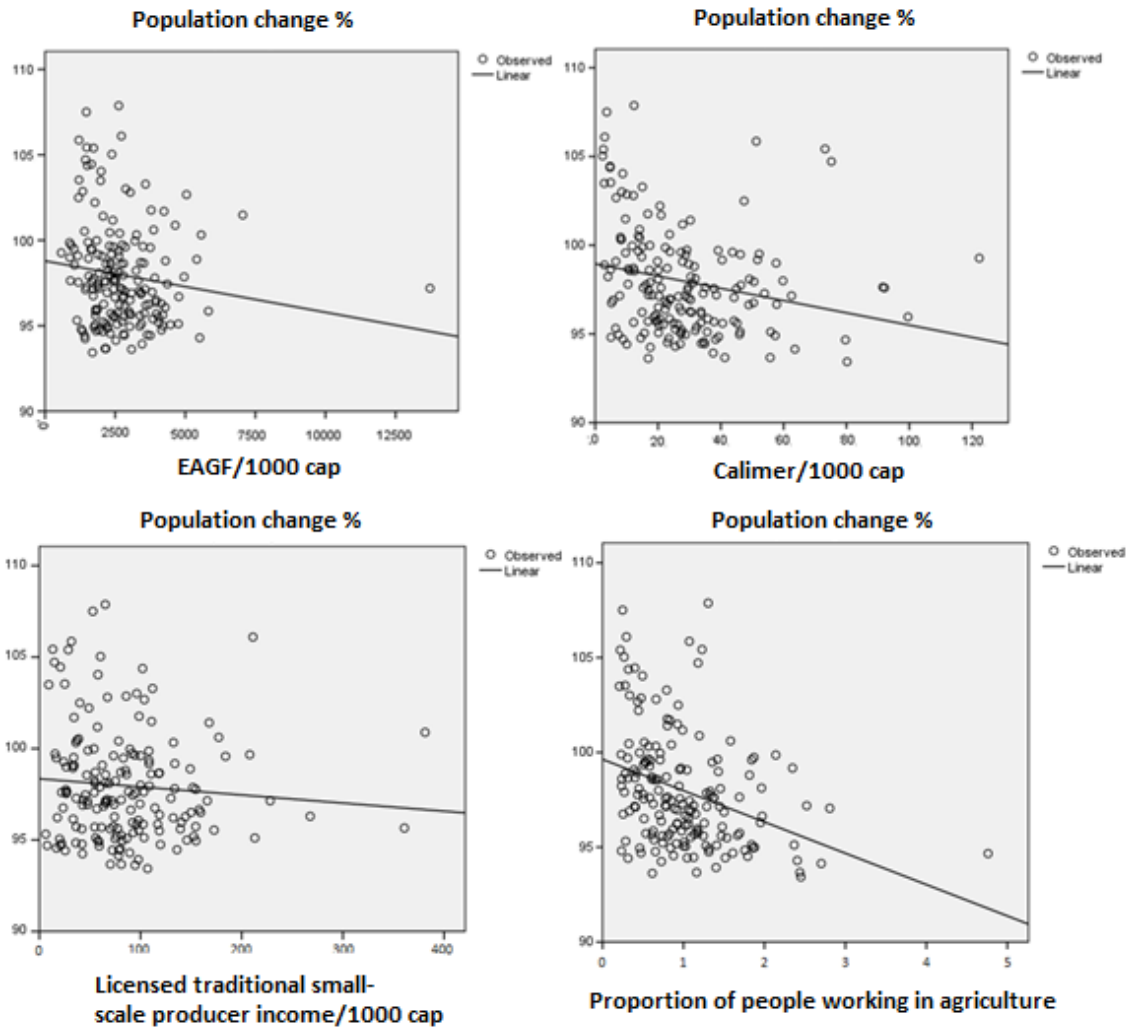


Figure 1: Relationship between the EAGF / 1000 persons, the number of applicants / 1000 persons, the income of primary producers / 1000 persons and the proportion of persons employed in Agriculture in relation to population change
(Source: Own resource, 2021)

Quartiles and the results of the spatial autocorrelation analysis:

The analysis of Figure 2 shows that there are 3 prominent districts, with the highest value being the Bólyi district, where the EAGF support per capita reaches HUF 1.3 million. It is followed by 700 thousand in Martonvásár and a value of around 580

thousand in Mezőcsát. There are several Transdanubian districts in the upper quarter, such as a sailing boat-shaped area at the southern border from Nagyatád district to Szekszárd and south of Téti district. Furthermore, most of Fejér county and another area around the Papal district. In the eastern part of the country, there is an arrow-shaped area from the Mezőkövesd district to Gyomaendrőd, which belongs to the upper quartile. We can see districts between 380 thousand and 550 thousand in this quartile, in addition, it turned out that most of the values with per capita support are located in Transdanubia.

The following can actually be considered an agglomeration of the upper quarter as well. There is a more significant such zone from Edelényi in Balmazújváros and in Transdanubia along the districts of Győr, Sopron and Szombathely, and in the south from Lenti to Kaposvár district. Districts between 249,000 and 342,000 fell in this province. A kind of agglomeration arrangement can also be seen between the bottom two quartiles. The two areas with the lowest values are Nyírség and a U-shaped area in Békés and Csongrád counties, and the western half of the Northern Central Mountains. The connection between the Danube and the Tisza is almost uniform in the two lowest quarters.

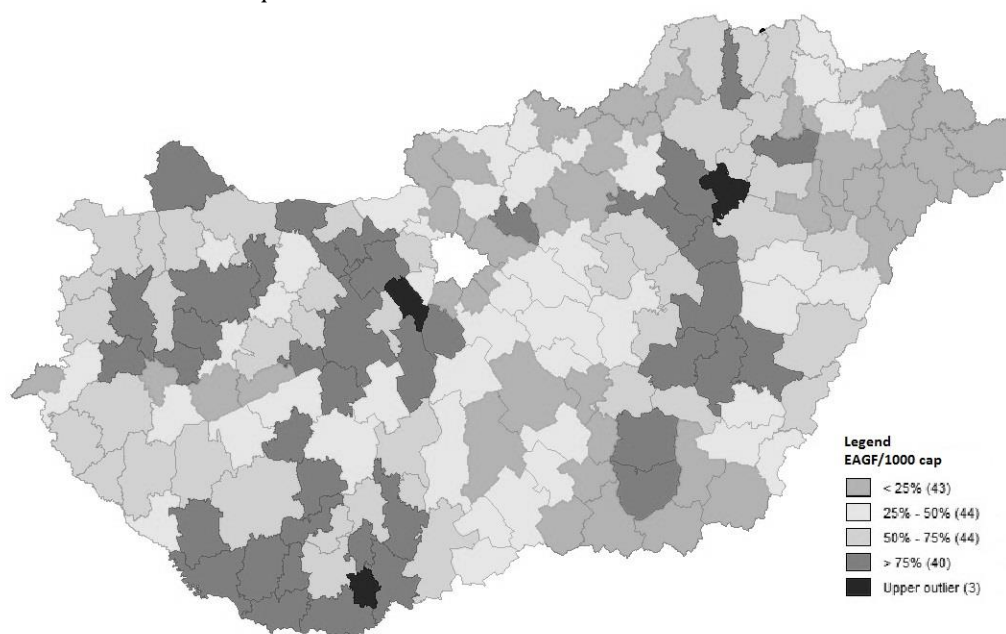


Figure 2: EAGF / 1000-person quartiles
(Source: My Edit, 2021)

The regional car correlation analysis in Figure 3 for the EAGF resource per thousand inhabitants shows where the highest concentration of holdings is based on neighborhood conditions. Where the value of the given district and its neighbors is high are the districts of Tiszafüred, in Transdanubia the districts of Bicskei, Székesfehérvár and in the south of Kaposvár, Szigetvár, Pécs, Siklós, Mohács, Bólyi and Pécsvárad. There are a few districts where the value of the given district is low, but its neighbors are of high value, as in the case of Érdi, Bonyhádi and Gárdonyi districts. Starting in the districts of Gyál, Vecsés and Cegléd, to the districts of Kiskunhalas, Mórahalom and Szeged, there are people with low and low food, similarly in almost the whole of Szabolcs-Szatmár-Bereg county, where most of the orchards are located. In the north there is another low-low value area in the districts of Ózd, Pétervárárai, Bátorterenyé and Salgótarján.

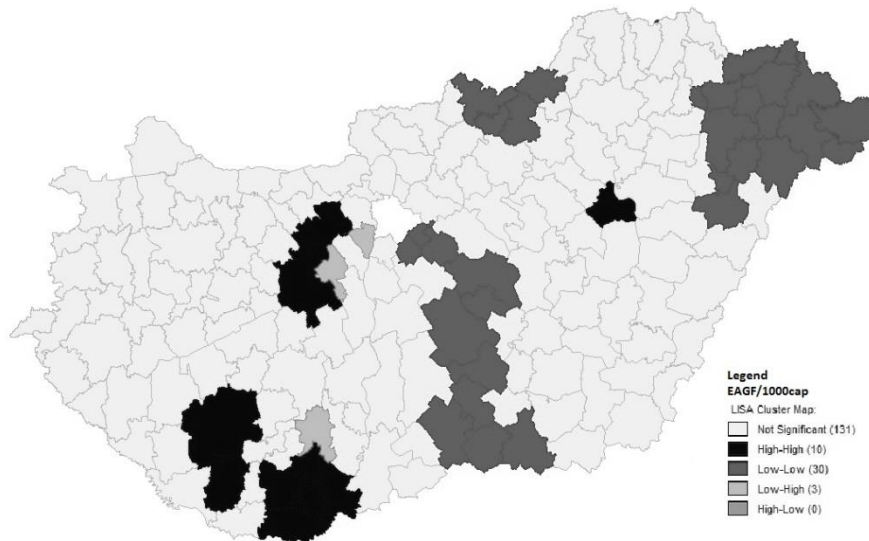


Figure 3: Regional autocorrelation distribution of EAGF / 1000 people
(Source: My Edit, 2021)

We can also see interesting results in the distribution of the number of applicants. Among the outstanding values are mostly fruit and vegetable growing regions, such as the Fehérgyarmat and Csengeri districts in the east, or the Mezőkovácsháza, Mórahalom, Kiskőrös, Kiskunmajsa, Kistelek and Jánoshalma in the south. The area with the highest value in the whole country is the Mórahalom district, where there are 122 applicants per 1000 inhabitants. The other protruding districts are between 71 and 99 people, with the higher values typically being the southern districts. In the upper quarter, the number of claimants per 1,000 inhabitants is between 37 and 71. The districts of Szabolcs-Szatmár-Bereg, Hajdú-Bihar, Békés and Bács-Kiskun

counties are included here. A semicircle is clearly visible along the eastern and southeastern borders of the country, there are the most agricultural, the highest quality areas of the whole country and the concentration of holdings is also the lowest here. Unfortunately, in Transdanubia it is rare to see a district belonging to this province, only Tamás, Sárbogárd, Csorna and Csurgó. In the two lower quartiles, 1.4-2.4% of the population is in demand, such as the districts around Budapest, almost the entire Fejér county. But we can also interpret that the number of applicants per 1000 inhabitants is low from Bükk to Bakony, as well as in the districts of large rural cities. So there are several options here, one of which is very high population and therefore low demand or high concentration of holdings, and small size of eligible area due to topographic conditions, it will be worthwhile to carry out further studies to explore these problems.

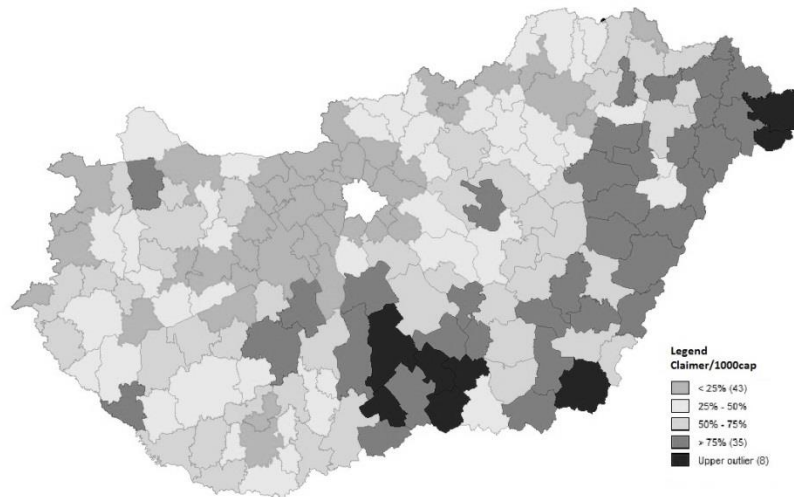


Figure 4: Number of applicants / quartiles of 1000 people
(Source: My Edit, 2021)

Regarding the autocorrelation analysis of Figure 5, two areas running in parallel directions are almost visible. Those showing low-low neighborhood relations stretch from the Balatonfüred district to the Edelényi district in a north-eastern direction, while those with high-high values run from Vásárosnaményi in a south-western direction to Kalocsa. There are indicators of an island-like appearance in some places, such as the Kisbér district with high-low value or the Debrecen, Szeged and Baja districts with low-high value.

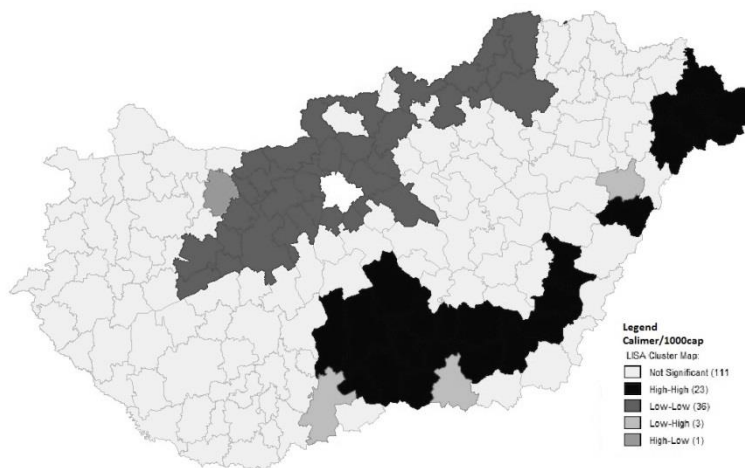


Figure 5: Number of applicants / 1000-person regional autocorrelation distribution
(Source: My Edit, 2021)

The figure below shows the distribution of primary producer incomes. Outliers show an island-like distribution of primary farmer income per 1,000 primary producers. Thus, the districts of Budakeszi, Bicskei, Szigetvár, Mohács, Mezőtúr and Mezőcsát are among the protrusions. The highest income per primary producer in the Bicske district is HUF 381 thousand per year. It is worth noting that this is tax-deductible income, which is not equal to sales, and because of the tax benefits, there are many primary producers who do not have to be taxed at all, so they do not generate tax-deductible income but have a primary producer status. There are 2 amount-dependent areas in the upper quarter, from Edelényi to Miskolc, Hajdúnánás, Egrin, Heves all the way to the Szeghalmi district, which are located in the east of the country. The other is located almost along the Danube, from Tatabánya through Enying to the Baja district. I would also like to highlight a couple that are island-like, such as Békéscsaba, Hódmezővásárhely or the Mosonmagyaróvár and Marcali districts. With the lowest per capita income, it is between 75 thousand and 160 thousand. Those in the western part of the country are typically of higher value. Among those with the lowest value are the lines from Nyírség, Sátoraljaújhely and from Bükk to Budapest. Something between the Danube and the Tisza and the western part of Southern Transdanubia in the triangle of the districts of Fonyód, Csurgó and Szentgotthárd.

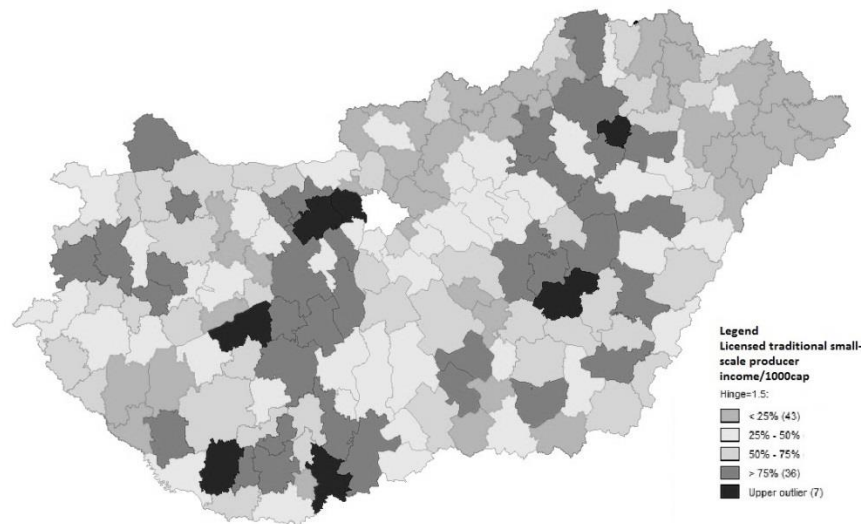


Figure 6: Primary producer income / 1000 persons (primary producer) quartiles
(Source: My Edit, 2021)

During the exploration of the neighborhood relations of primary producers' incomes, we can see that the districts of Tatabánya, Martonvásár, Székesfehérvár, Enyingi, Tamási, Bonyhád, Szekszárd and Hegyhát belong to the high-high, ie the value of itself and its neighbors. In the eastern part of the country, the districts of Hajdúnánás, Mezőcsát and Törökszentmiklós, Karcag and Kunhegyes. Where the district value is high for the district and its neighbors are low, the districts of Cigándi, Szécsényi, Szentendre and Hódmezővásárhely. Those with low-low values are from Ózd to Gödöllő and from Gönczi to Csengeri.

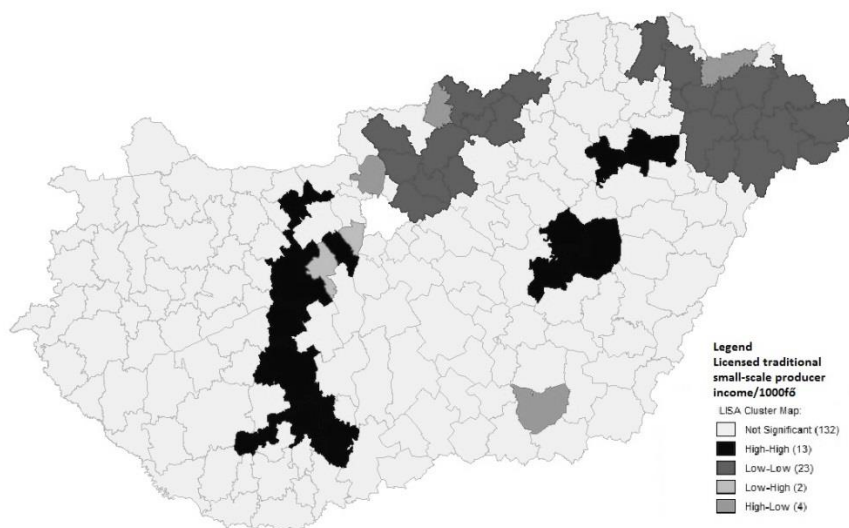
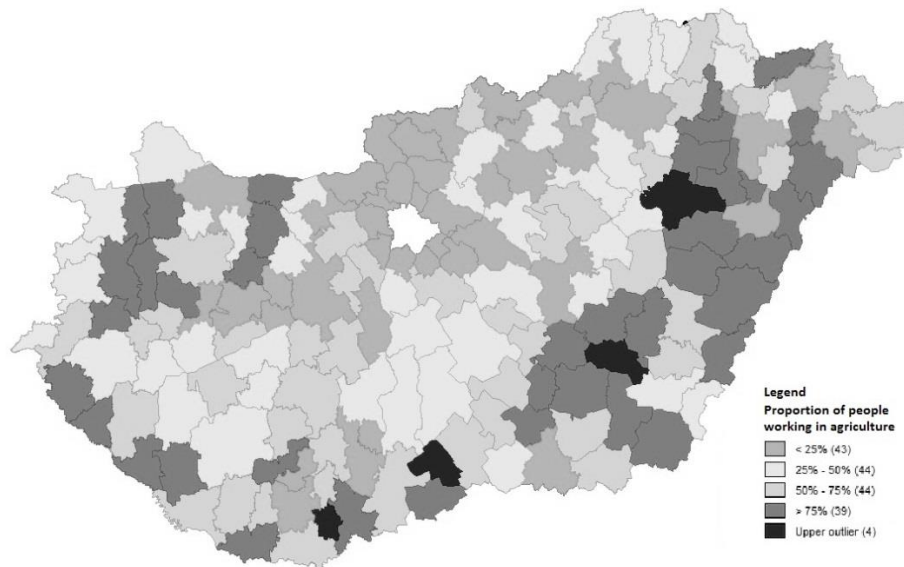


Figure 7: Territorial correlation distribution of primary producer income / 1000 persons (primary producer) (Source: My Edit, 2021)

The proportion of people employed in agriculture also shows an interesting picture, here it is clear which areas, in addition to food production, also contribute the most to employment. There are four prominent districts. Szarvas, Balmazújváros, Bólyi and Jánoshalma, where it is also the highest in the country with 4.76%. In the upper quartile there are districts between 1.3% and 2.4%, such as the agglomeration of the Szarvas district, the districts of Orosháza, Szentesi, Gyomaendrőd, Mezőtúr, Mezőkovácsháza, Kunszentmárton. Almost all the areas of the country bordering Romania belong to this district, from the district of Nyírbátor, Tokaj to Sarkadi. Rarely, such districts as Bácsalmási, Csurgói or Lenti can be discovered at the southern and south-western borders of Hungary. But we can also see a U-shaped section in Kisalföld, including the districts of Komárom, Kisdörög, Zirc, Devecser, Celldömölk and Kapuvár. It can be seen that the proportion of people employed in agriculture is located on the outskirts of the country, as employment is lower here but the land is of good quality, so agriculture is the main employer.



*Figure 8: Quartiles of employment in agriculture
(Source: My Edit, 2021)*

In Figure 9, a regional autocorrelation analysis revealed that there are two opposite poles, the periphery of the country and Budapest and its agglomeration. There is a high-high focal point in the districts of Derecske, Berettyóújfalu, Szeghalmi, Gyomaendrőd, Békés, Hajdúszoboszló, Karcag and Püspökladány and their neighbors, and in the south in the districts of Baja and Bácsalmási, and a smaller set in the district of Celldömölk. We can see the districts of Bicske, Szécsényi and Bélapátfalva with high - low values. With a low-high value, we can see some larger districts playing a central role, such as the Békéscsaba and Debrecen districts or the less large Kiskunhalas district.

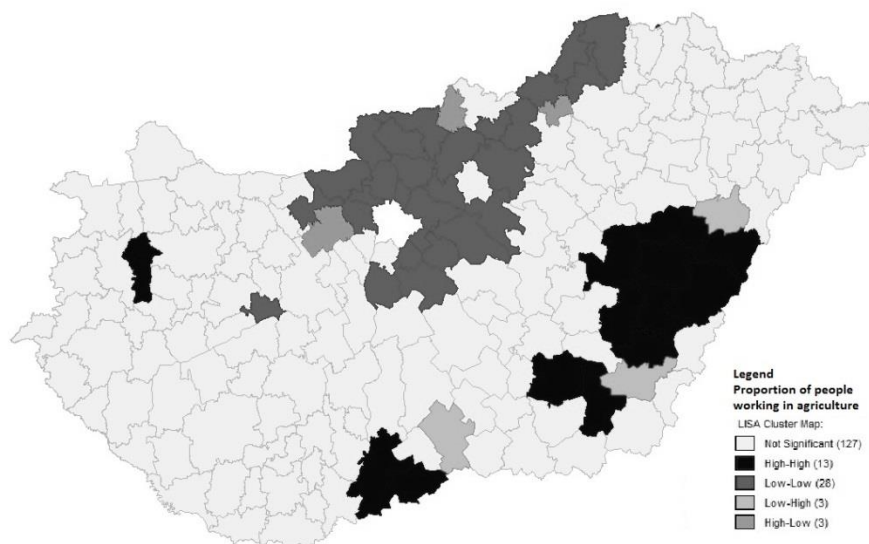


Figure 9: Territorial autocorrelation distribution of the share of people employed in agriculture
(Source: My Edit, 2021)

Summary

In terms of results, it can be said that the 3 EAGF items I examined do not have a particular effect on population change. As the proportion of applicants is very low compared to the total resident population, it is difficult to influence the change in the resident population, as in the case of primary producer income or the number of applicants. There is a relationship between agricultural employment and population change, which is a negative but not a causal relationship. It is not due to those employed in agriculture that the population is declining in rural areas, but it seems that where the proportion of people employed in agriculture is high, the resident population is declining the most. Subsidies show a kind of East-West division, while in the East the amount of subsidies per 1000 people is lower, while in the West it is much higher, which presupposes a higher concentration of holdings. There are three highly centralized areas, one in Fejér county, the other in Baranya and an arrow-shaped part in the east, from Hortobágy to the Gyomaendrőd district.

The number of applicants per 1,000 inhabitants is concentrated in 4 counties, in the eastern, south-eastern and southern parts of the country, ie Szabolcs-Szatmár-Bereg, Hajdú-Bihar, Békés and Bács-Kiskun. In the case of primary producers' incomes, we see almost a reflection of EAGF resources with minor differences. As for the proportion of people employed in agriculture, we can see that it is the largest

in the peripheral areas, while the central area of the country, ie Budapest, is decreasing. It may be worthwhile to carry out further analyzes of how the circle of those requesting resources develops in relation to two distant dates.

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Study on the main tourist attractions in apuseni mountains area

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Abstract

In this article, the authors analyze the tourist attractions in the Apuseni Mountains area. It can affirm with certainty that one of the most attractive tourist destinations in Romania is the Apuseni Mountains. The fauna, flora, relief and traditions are still preserved in the studied area, which is a place that no tourist should miss. The Scărișoara Glacier, the Vârtoș Glacier, the Bear Cave, the Ponor fortresses, etc., are among the most well-known tourist attractions in the area.

Keywords

tourism, mountains Apuseni, attractions tourist, tourist

Introduction

Tourism can become one of the key factors in the process of economic recovery, taking into account the fact that the Apuseni Mountains have a huge tourist potential, suitable for various types of tourism. One of the main aspects to be addressed in the tourism of the Apuseni Mountains is the insufficient use of its potential or its use in inappropriate conditions.

The Apuseni Mountains have a valuable and rich tourist potential, which is one of the most valuable resources of the region.

Among the most important elements of the tourist potential of the Apuseni Mountains, we mention: relief, climate, hydrography, vegetation, fauna, nature reserves, archaeological remains, architectural monuments, history and art, museums and memorial houses. The main forms of tourism, practiced in the Apuseni Mountains area are: mountain tourism (mountain climbing, hiking, winter sports), rural tourism and agrotourism, spa tourism (GeoagiuBăi and Stana de Vale resorts), cultural tourism, hunting tourism, tourism speleological and scientific tourism.

Material and methods

To write this article, the authors analyzed various bibliographic sources, books, reports, strategies and sites in the field studied, and as working methods they used: analysis, observation and data collection.

Results

The Apuseni Mountains area is located in the western part of Romania, between the Tisza Plain (V) and the Transylvanian Plateau (E) The Apuseni Mountains area is the place where the three Crișuri, Someșul Mic and Arieș River spring.

In order to define the studied area, the Mureș Corridor (S), the Someș Corridor (N), the Transylvanian Depression (E), the Hills and the Western Plain (V) were taken as limits. In the northern part, the studied area is bordered by the Șimleului Depression, and in the eastern part by the Transylvanian Plateau, the Transylvanian Plain and the Cluj Hills. In the southern part, it borders the Lipovei Hills, the Poiana Ruscăi Mountains, the Hațeg - Simeria Depression. The western part is the largest and intersects with Piedmont hills and plains. (Arad Plain and Crișilor Plain) Figure 1 represents the location of the Apuseni Mountains area in Romania.

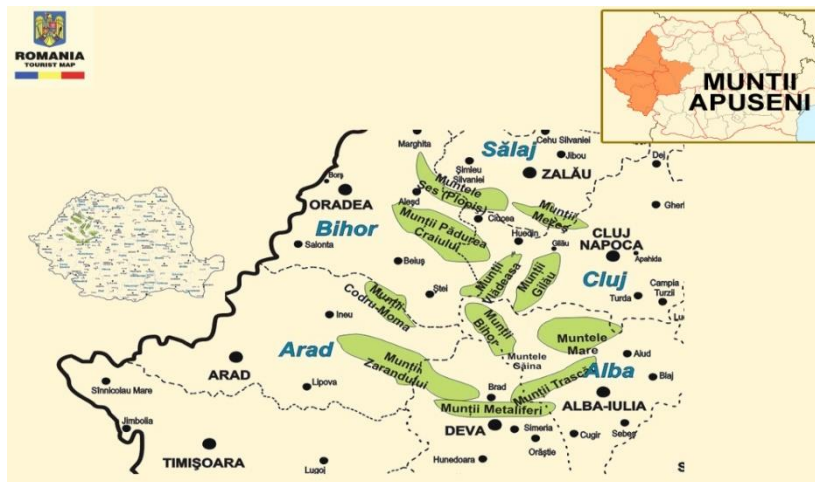


Figure .1 Contour of Apuseni Mountains Area
Source: www.wikipedia-muntii-Apuseni.com

The Apuseni Mountains area has a variety of relief forms, among which the largest share is the mountainous area. In addition to the mountainous area, in this area there are also hill, plateau and plain areas.

The mountainous section is part of the Western Carpathians group and is the most complex branch. It is made up of a variety of mountains, with heights between approx. 800-1800 m. The central part of the Apuseni Mountains includes: the Bihor mountains, with the peaks of Bihor (1849 m), Vlădeasa (1836 m) and Găina (1467 m). In the eastern part are located the Trascău mountains with the peaks Poenița (1437 m), Detunata (1258 m) and Muntele Mare (1828 m). In the northern part are the Șes mountain and the Meseș mountains. In the western part there are short mountains such as the Zarandului mountains (with the highest peak of 799 meters),








the CodruMoma mountains and the Craiului Forest. The southern part of the mountain includes the Metaliferi mountains, mountains that contain important deposits of non-ferrous ores.

In terms of tourism, the Apuseni Mountains area benefits from an extremely important tourist potential. The structure of the accommodation units was composed of: hotels, chalets, tourist villas and school camps. The cottages are located entirely in rural areas. Accommodation as well as places in restaurants are concentrated in the resorts of GeoagiuBăi, Moneasa and Stâna de Vale. Mountain tourism offers the possibility of rest, hiking, mountaineering, speotourism and winter sports.

The special landscapes, the tourist routes, the caves present in the area, as well as the ski slopes from Arieșeni, Stâna de Vale, Fântânele and Băișoara are only a few arguments for mountain tourism.

The studied area has a wealth of natural therapeutic factors that allow the practice of a balneoclimatic tourism. Among them we mention: 9 geothermal waters, sulphated and sulphurous waters at Geoagiu Băi and Vața; 9 carbonated waters at Băcia, Chimindia and Vața; 9 vegeto-mineral sludges at Geoagiu Băi; 9 bicarbonate waters, calcium, sodium magnesium at Moneasa. The tourist facilities are concentrated in the resorts of Geoagiu Băi, Vața, Moneasa, Stâna de Vale.

Due to this fact, a lot of tourist accommodation structures have been built, such as:

-  hotels,
-  tourist chalets,
-  tourist villas,
-  tourist pensions
-  agritourism pensions
-  campgrounds
-  student and school camps.

Next we will present, for the period 2005-2018, the evolution of the tourist reception structures with accommodation functions (table 1.)

-places -

Table 1. Evolution of tourist reception structures with accommodation functions, in the period 2005 - 2018

Apuseni Mountains area	2005	2010	2015	2016	2017	2018
Total	209	387	516	631	667	724
Hotels	2.3	112	129	134	135	138
Camps for students and schoolchildren	21	27	45	55	56	59
Tourist pensions	2.3	63	85	92	95	108

Agrotourism pensions	41	72	92	101	111	129
Tourist villas	26	27	67	69	72	81
Tourist chalets	12	20	101	109	111	119
Camping sites	11	26	67	71	86	90

Source: National Institute of Statistics, 2004-2019

In the Apuseni Mountains area, the tourist accommodation capacity has a positive evolution, from 209 accommodation units in 2005, to 724 accommodation units in 2018, as can be seen in table 1. This increase is due to the tendencies of people to spend as much time as possible in nature, to the evolution of tourist and agrotourism pensions, but also to the increase in the promotion of the studied area.

As can be seen in figure 2., Out of the 724 accommodation units, registered in the area studied by us, 19% are hotels (138 hotels), followed by agritourism pensions (18%), tourist chalets (17%), pensions tourist (15%), and the lowest percentage is held by students and schoolchildren (8%).

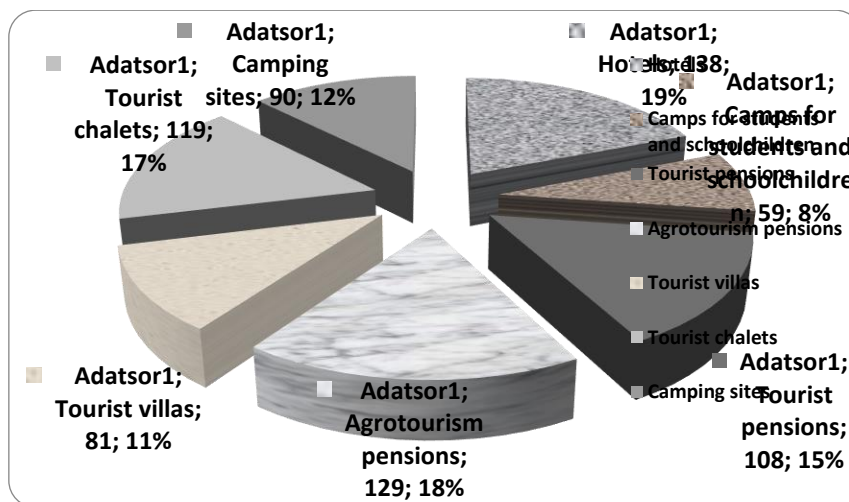


Figure 2. Distribution of tourist reception structures with accommodation functions, in 2018

If above we analyzed the evolution of tourist reception structures with accommodation functions, below we will describe some tourist attractions representative of the area we studied in this article.

1. The Glacier from Scărișoara Cave. The Scărișoara Glacier Cave is home to the second largest underground glacier in southeastern Europe. Thus, the Scărișoara Glacier is one of the most important caves in Romania. The Glacier Cave from

Scărișoara is located on the area of the Apuseni Natural Park, in the village of Ghețari at an altitude of 1165 m. It is part of the karst system Ocoale - Ghețar - Dobrești. The Scărișoara Glacier Cave opens to the surface in the form of an aven (vertical cave entrance) with a maximum diameter of 60m and 48m depth.



Figure 3. Scărișoara Cave

Source: https://ro.wikipedia.org/wiki/Peștera_Scărișoara

2. Bear Cave. Bears Cave was discovered in 1975, on the occasion of a dynamite executed at the marble quarry in the area. It is one of the main tourist attractions of Apuseni Mountains, she being in Bihor county, in the immediate vicinity of the village Chișcău, Pietroasa commune, at an altitude of 482 m. T

he interior is distinguished by the diversity of formations stalactites and stalagmites existing, as well as by the impressive amount of traces and fossils of the cave bear- *Ursus spelaeus* - which disappeared 15,000 years ago. In addition, fossils of black goat, ibex, lion and hyena of cave.

With a length of over 1,500 m, the cave consists of galleries on two levels: the first gallery, the upper one, 488 meters long can be visited by tourists, and the second, 521 m long is reserved for research scientific.



Figure 4. Bear Cave

Source: https://ro.wikipedia.org/wiki/Peștera_Urșilor

3. The fortresses of Ponor. The fortresses of Ponor are one of the largest complexes landrailfromRomania, located in Apuseni mountains, Padiș area.

The Ponor Fortress Cave has a main gallery 2 km long, active, of impressive dimensions in which a strong river, perhaps the largest underground river in the country, flows forming waterfalls, rapids and whirlpools.

The entrance to the cave is made through a portal 70 m high and 30 m wide that perforates the wall of the first sinkhole, which is also gigantic. (300 m depth, 1000 m diameter). After a few tens of meters from the entrance, the second sinkhole, 70 m in diameter and 150 m high, intersects with vertical walls. Also here under the portal comes out of a gallery a strong river. It is the water that disappears into the siphon fromCaput Cave. It then disappears immediately into another gallery mouth that represents the beginning of the underground river of the Citadels. The third sinkhole is the largest and gives direct access to the active gallery.



Figure 5. Ponor Fortresses

Source: <https://padureacraului.ro/pestera-vadu-crisului2/>

4. "Avram Iancu" Memorial House. "Avram Iancu" Memorial House is an ensemble of historical monuments located on the territory of the village in the commune of Avram Iancu, Alba county, Romania. The museum is housed in the parental house, built around 1800, by Avram Iancu's parents: Alexandru and Maria Iancu. It is a typical manor house with a sloping roof and finished with four semicircular arches. In the museum are exhibited photographs, family documents, personal items, cannon, swords and Iancu's whistle, weapons, flags.

The ethnographic exhibition includes a moat, vessels specific to the area, tools used to make ciubere, tulnice, carts.



Figure 6. Avram Iancu Memorial House

Source: https://ro.wikipedia.org/wiki/Casa_memoriala_Iancu

5. Vârtop Glacier Cave. Vârtop Glacier Cave is known and appears under several names the Wonderful Cave or Glacier of the Stone House and is the place where the oldest trace of Neanderthal man from Romania.

The name of the cave comes from the plateau under which it is located, the Vârtop plateau, the peaks being the depressions (sinkholes) that are formed in the karst areas.

The Vârtop Glacier is located on the territory of the commune Arieseni, Alba county, in the Bihor Mountains. The ice block is about 1,600 cubic meters.

The importance of the cave lies especially in the richness of the calcite deposits, very varied in type and well preserved. Although small, it is one of the most beautiful caves in the country due to the conservation of ornaments.



Figure 7. Vârtop Glacier Cave

Source: <https://muntii-nostri.ro/ro/povestiri/pestera-ghetarul-de-la-vartop>

In conclusion, the Apuseni Mountains area is one of the most attractive and offering tourist destinations in Romania.

Conclusions

The area studied by us has many accommodation structures, special landscapes, tourist routes, protected reservations and numerous tourist attractions, where you can practice various types of tourism.

Regarding the accommodation structures, the Apuseni Mountains area has many tourist pensions, agrotourism, tourist chalets, but also hotels. In this area are often organized school camps for children or various relaxation trips for adults.

Therefore, the Apuseni Mountains area has a special but untapped tourist potential. The different and difficult living conditions in the studied area and in the ne-

ighboring regions force the development and implementation of strategies to support sustainable economic and social development in this area, by applying programs that highlight the true natural and human potential of this area.

The Apuseni area is very rich in folklore and culture. Here you will find unique traditions and customs, crafts long gone from the rest of Europe and popular ports whose reinterpretation has made the world go round.

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Spatial structure in 2020 of Hungarian unemployment and public employment

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Abstract

This paper explores the clustering and correlations of the concentration of unemployed and publicly employed persons by educational attainment in Hungary in 2020. The analysis has shown a strong positive correlation between the number and concentration of unemployed and publicly employed. The spatial dependence of the headcount data is plotted on a co-location map. The under- or over-representation of groups by educational attainment at the settlement level was explored by location coefficients. The spatial autocorrelation of the resulting concentration values revealed whether over-representation clustered in space.

Keywords:

unemployment, public employment, location quotient, spatial autocorrelation, co-location map

Introduction

The new labour market situations in Hungary as a consequence of the 2008 crisis and the associated income shortages have required state intervention (Csoba 2010). In order to tackle the labour market crisis, a strong increase in the role of the state was needed in Hungary, which was reflected in employment policy. Within the set of instruments designed to address labour market anomalies, priority was given to widening the scope for public employment.

Regional development is significantly determined by the labour market situation (Egri et al. 2009, Egri – Tánczos 2018). There are large differences between EU Member States in the resources devoted to labour market interventions as a share of GDP. According to the most recent available data from the European Commission Labour Market Policy (LMP), Hungary is in the middle of the pack in terms of total active employment policy expenditure. In 2019, Hungary spent less on active measures as a share of GDP (0.790%) than Germany (1.318%) and the Nordic countries, but more than some Central and Eastern European and Mediterranean countries. According to LMP data, Hungary spent the most on job-seeker's allowance and social assistance in employment policy expenditure up to 2011. The distribution of spending by measure changed from 2012, with a significant increase in spending on direct job creation (public employment programmes). Hungary (0.348%) spent the most on this type of measure as a share of GDP in 2019, alongside Greece (0.214%), Finland (0.188%), Ireland (0.133%) and Spain (0.113%).

Today, public employment programmes are part of the active employment policy instruments in many countries. In the United States (Job Corps, National Supported Work) and the United Kingdom (New Deal for Young People), active employment policy programmes are targeted at a specific problem or age group. In most of the continental European countries, comprehensive national programmes are organised, where the number of participants in public employment is typically higher in regions with low employment rates (Kessing – Strozzi 2017). International research on the subject has shown that targeted programmes with a complex treatment have a higher effectiveness compared to extensive programmes (Hudomiet – Kézdi 2008). In the aftermath of the 2008 crisis, Latvia, Hungary, Slovenia, Portugal and the Czech Republic among the EU Member States have implemented public employment programmes on a larger scale (Kálmán 2015). Overall, well-targeted public work programmes can be a tool to fight poverty by providing temporary employment (Brown – Koettle 2012, Zimmermann 2014).

This study explores the clustering and correlations of the concentration of unemployed and publicly employed persons by educational attainment in Hungary in 2020. In the study, I research whether regular spatial patterns can be detected in the spatial concentration of unemployed persons by educational attainment. As part of the research I researched the spatial interdependence between clusters.

Literature review

As a result of the 2008 economic crisis, the average monthly number of jobseekers increased by approximately 120 thousand in the year following the crisis, which corresponded to a significant increase of 27.01%, with the relative rate of jobseekers reaching 12.8%. According to the NFSZ, the average monthly number of registered jobseekers peaked in 2011, with 580 thousand people registered, when 76 thousand people were in public employment (Fig 1).

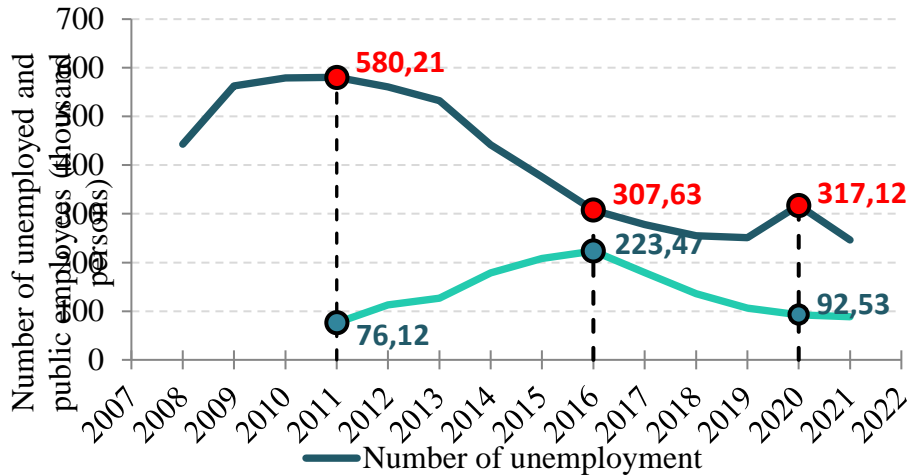


Figure 1. Changes in the average annual number of unemployed and public employees (2008-2021)
 (1) National Employment Service, (2) Ministry of the Interior

In Hungary, the active employment policy instruments and the benefit system underwent a major change in 2011, resulting in a significant improvement in unemployment statistics. The National Public Employment Programme was introduced and can be considered as a "workfare" type of public employment scheme. The term "workfare" is a contraction of the words working-for-benefit, which means "work for benefit" (Lodemel 2000). Workfare schemes are characterised by the fact that the recipients of benefits are required to fulfil various conditions aimed at improving the employability of the beneficiary (training, rehabilitation, work experience), but also by the fact that they are required to carry out activities that are beneficial to society (e.g. public works).

The year 2012 was another milestone, with the launch of the Start model programmes, which also introduced the economic objective structure of value creation. Between 2009 and 2016, the number of people in public employment increased steadily, reaching an average of 223 469 per month in 2016. Meanwhile, unemployment has decreased, with approximately 308,000 people registered in 2016.

Subsequently, as the labour supply slowly shrinking, the number of registered jobseekers fell to 251,000 by 2019. The relatively short period of recovery was ended by the economic recession associated with the emergence of the coronavirus epidemic at the end of 2019 (Győri 2021). As a result of the economic recession caused by the restrictions associated with the epidemic, the number of jobseekers increased by 25.95% compared to 2019, similar to the surge in the year following the 2008 economic crisis. According to the National Employment Service (NES), the average monthly number of registered jobseekers reached 317,000 in 2020. The relative rate to the working age population was 6.8% at national level.

The number of jobseekers was particularly high in the Eastern regions (Hajdú 2020). Compared to urban areas, the employment situation in rural areas is much more backward (Bódi – Obádovics 2000). The relative rate is the ratio of registered jobseekers to the population aged 15–64 in a given territorial unit. The rate provides more nuanced information on unemployment than the headcount data.

Material and methods

The territorial base of the study was the settlements of Hungary. There are currently 3,155 settlements in the country, of which – according to the 2019 local nomenclature of the CSO – 1 is a capital city, 23 are cities with county status, 322 are towns, 128 are large settlements and 2,681 are settlements. Government Decree 105/2015 (23.IV.2015) classifies 839 settlements as settlements with significant unemployment.

Data on the registered unemployed by educational level at settlement level were provided by the TEIR Registered Unemployed Database, while data on the publicly employed were provided by the Ministry of Interior. Three groups were distinguished by educational attainment: primary, secondary and tertiary. The group of people with primary education includes those with less than 8 years of primary education and those with less than 8 years of primary education. Those who have completed vocational training, vocational school, technical school, upper secondary school and technical college were placed in the intermediate group, while those with higher education were placed in the group of those with college and university degrees.

In this research, I researched the spatial structure using the location quotient (LQ) and spatial autocorrelation. According to Cromley – Hanink (2012), LQs and local spatial autocorrelation methods complement each other in the analysis of clusters, as the latter ensures that spatial interaction is accounted for.

The location quotient is well suited to the study of domestic areas (Vas et al. 2015). In this research, I have mapped groups with a decisive weight within registered jobseekers and the publicly employed. The selected statistical measure expresses whether the proportion of unemployed/publicly employed persons belonging to a given group in a given settlements is under- or over-represented compared to the average of that group (Gyóri – Egri 2020). If $LQ=1$, it can be interpreted as the same percentage distribution of jobseekers in a given group in the settlements under study as the share of that group in the stock of jobseekers.

The second pillar of the research was a spatial autocorrelation study to see whether the over-representation that could be detected for each category clustered in space. As part of the research, I also produced Global and Local Moran I statistics. A value of Global Moran I close to 0 indicates a random spatial distribution of the data (Anselin 1995). The Local Moran I is a spatial autocorrelation test that provides information on the spatial distribution of inequalities using a spatial representation

(Tóth 2003), ignoring the extent of the differences. The Local Moran I assign a numerical value to each settlement, with an expected value of 0. Therefore, a value significantly different from 0 indicates a detectable regularity in the spatial distribution. The 4 plane neighbourhoods of the scatter plot represent the High–High, Low–Low, High–Low and Low–High groups (Tóth 2003). In the autocorrelation study, the neighbourhood relationships were based on inverse distance, with a total number of 999 permutations.

As part of the research, I used the Co-location map feature of Geoda software to analyse the overlaps between the clusters formed by each group of unemployed and publicly employed people. Co-location map is a spatial information technique that extends individual value maps into a multivariate context (Anselin 2020). The map can be used to identify areas of spatial interdependence (Klinkhamer et al. 2017).

Results

Figure 2 provides information on the spatial distribution of the number and share of jobseekers. The number of registered unemployed is much higher in the eastern part of the country. Compared to the working age population, Nógrád, Heves and Borsod-Abaúj-Zemplén counties, as well as Somogy and Baranya counties, are hit by high unemployment. It is striking that unemployment in Pest and Győr-Moson-Sopron counties was below the national average in 2020.

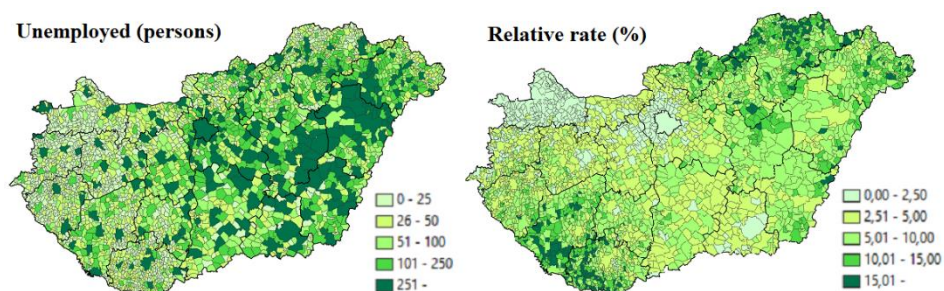


Figure 2. Number of unemployed (persons) and relative rate (%) in 2020
(1) Own editing based on National Employment Service data

In Hungary, the flagship of public employment is the eastern part of the country, with Borsod-Abaúj-Zemplén, Szabolcs-Szatmár-Bereg, Hajdú-Bihar and Békés counties having been affected by significant employment policy interventions (Fig 3). The public employment indicator shows the weight of public employment as an active labour market instrument, as a share of the average annual number of people in public employment in relation to the working age population aged 15–64. Like the relative rate, the public employment index provides a more accurate picture of the evolution of public employment. The public employment index is typically high in

settlements where the relative unemployment rate was also high, with the addition of some settlements in Hajdú-Bihar and Békés counties.

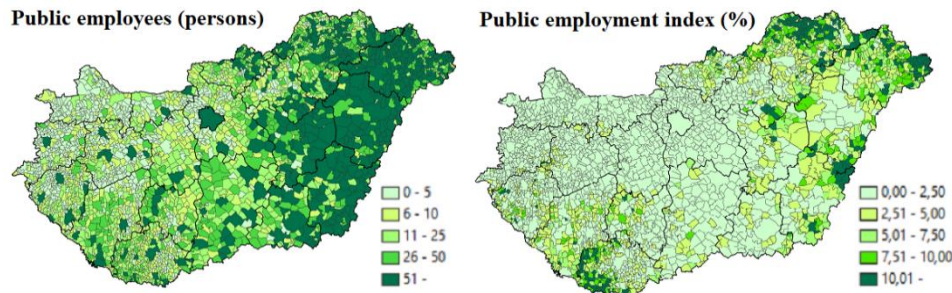


Figure 3. Number of public employees and public employment index (%) in 2020
(1) Own editing based on Ministry of the Interior data

The unemployment and public employment maps show a significant overlap. It can be seen that there is a strong correlation between the number and proportion of unemployed and publicly employed.

The clustering of the number of unemployed and publicly employed in 2020 was examined using Global Moran I statistics. The Moran I value $I_{UNE}=0.026$ calculated for the settlement level unemployment data. The value is considered to be very low, but the statistically significant positive Z value associated with it suggests that the spatial pattern is different from what would be expected as a result of random spatial processes (Tab 1). The Moran I value is much higher for public employees, $I_{PUBE}=0.292$, so in their case the spatial clustering of similar values is more pronounced.

The general spatial pattern was examined using the Local Moran I statistic, a local test function of spatial autocorrelation. Only settlements with a Local Moran I value that was considered significant at the 95% level ($p < 0.05$) were shown on the maps.

For registered jobseekers, 60 High–High and 973 Low–Low settlements can be identified, as well as 130 settlements with a sharp contrast for the selected criteria (Fig 4). The number of unemployed is higher than average in Budapest, Debrecen, Nyíregyháza, Békéscsaba, Szolnok and Kisújszállás and their surrounding areas. Most cold spots are in Győr-Moson-Sopron, Vas, Zala, Veszprém and Baranya counties. The larger High–Low outliers are typically in the western counties (Győr, Szombathely, Zalaegerszeg, Kaposvár), which have a high unemployment rate due to their population size, while the number of unemployed is low in the neighbouring settlements.

In the case of public employees, 430 hotspots have been identified, covering almost contiguous areas in Szabolcs-Szatmár-Bereg, Borsod-Abaúj-Zemplén, Hajdú-Bihar, Jász-Nagykun-Szolnok and Békés counties. The settlements in the eastern

part of the country have clearly emerged as hot spots. A significant Low–Low cluster of 1399 settlements is found in Pest, Komárom-Esztergom, Győr-Moson-Sopron, Vas, Zala, Veszprém, Baranya and Somogy counties. The sharp contrasts in the number of public employment affected 204 settlements.

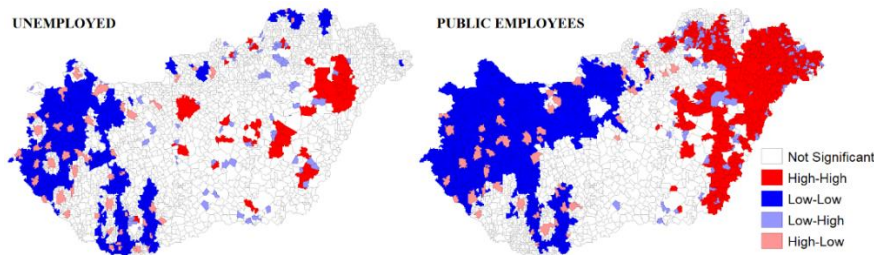


Figure 4. Clusters of the number of unemployed and public employees (2020)
(1) Own editing based on National Employment Service and Ministry of the Interior data

The spatial interdependence of the Local Moran I values at the settlement level calculated from the 2020 unemployment and public employment data was also researched on a co-location map (Fig 5).

On the Co-location map, the High–High group includes 38 settlements, in which case the number of unemployed and public employees is above average, and this is also typical of the neighbouring settlements. The 844 Low–Low settlement forms a larger, cohesive spatial unit, where the number of unemployed and public employees is below the national average. The significant difference in the number of unemployed and public employees characterizes 52 settlements.

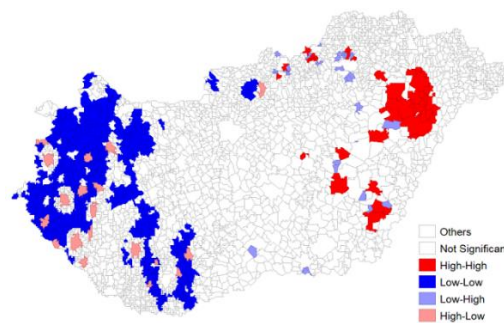


Figure 5. Co-location map – Clusters of number of unemployment and public employees
(1) Own editing based on National Employment Service and Ministry of the Interior data

In the rest of the research, I examined the spatial structure of the concentration of unemployed and publicly employed persons categorised by educational attainment.

Of the 317,000 jobseekers registered in 2020, 39% had 8 years of primary education or less, 25.8% had a vocational or technical school certificate, 28.2% had a secondary school certificate and 7% had a tertiary education. Overall, 39% were in the primary category, 54% in the secondary category and 7% in the tertiary category. While 62% of those in public employment had primary education, 37% had secondary education and only 1% had tertiary education.

In the framework of the research, the settlement level concentration (LQ) values for each group were calculated from the 2020 data on the number of unemployed and publicly employed. The calculated LQ values were analysed using the Global and Local Moran I methods to identify precisely those territorial units that are prominent in terms of the concentration of each group.

The obtained I, Z and significance (Sig.) values, as well as information on clustering, are presented in Table 1. The calculated Moran I and Z values are considered significant at the $p < 0.005$ level. The Global Moran I values calculated for the LQ values of the groups of unemployed and public employees by educational attainment demonstrated clustering, except for one group (public employees with tertiary education). For the groups of unemployed persons, a much higher degree of clustering was found than for the groups of public employees. The highest levels of clustering in both categories were found in the group with primary education.

Table 1. Global Moran's I values calculated on the data of the concentration of the unemployed with higher education at the settlement level (2020)

Groups	Moran I	Z score	Significance	Pattern
Unemployed (UNE)	0,026	3,010	0,002	Clustered
Unemployed – Primary	0,327	51,704	0,000	Clustered
Unemployed – Secondary	0,223	35,331	0,000	Clustered
Unemployed – Tertiary	0,226	35,929	0,000	Clustered
Public employees (PUBE)	0,292	31,658	0,000	Clustered
Public employees – Primary	0,101	14,477	0,000	Clustered
Public employees – Secondary	0,068	9,165	0,000	Clustered
Public employees – Tertiary	0,010	1,0314	0,000	Random

(1) Own calculation based on National Employment Service and Ministry of the Interior data

The resulting maps clearly identify the settlements that contributed most to the Moran index value indicating spatial autocorrelation. These are the hot spot (High-High) settlements, which, in addition to their high concentration in a given group, have similar neighbours with above-average concentrations. Settlements with lower than average concentrations and neighbouring settlements with lower than average concentrations are referred to as cold spots (Low-Low).

Figure 6 shows LISA maps of the concentration of unemployed people by educational attainment. The concentration of unemployed people with primary education

is over-represented in the eastern part of the country in the counties of Borsod-Abaúj-Zemplén, Szabolcs-Szatmár-Bereg and Hajdú-Bihar, and in the western part of the country in Baranya and Somogy counties. A significant coldspot has developed in Győr-Moson-Sopron, Komárom-Esztergom, Vas, Veszprém and Pest counties.

The hot and cold spots in the concentration of unemployed people with primary and secondary education are in contrast. The spatial clustering of the concentration of jobseekers with secondary and tertiary education is similar in 2020. Concentrations of unemployed with tertiary education are particularly high in Pest and Komárom-Esztergom counties, and in settlements bordering Austria.

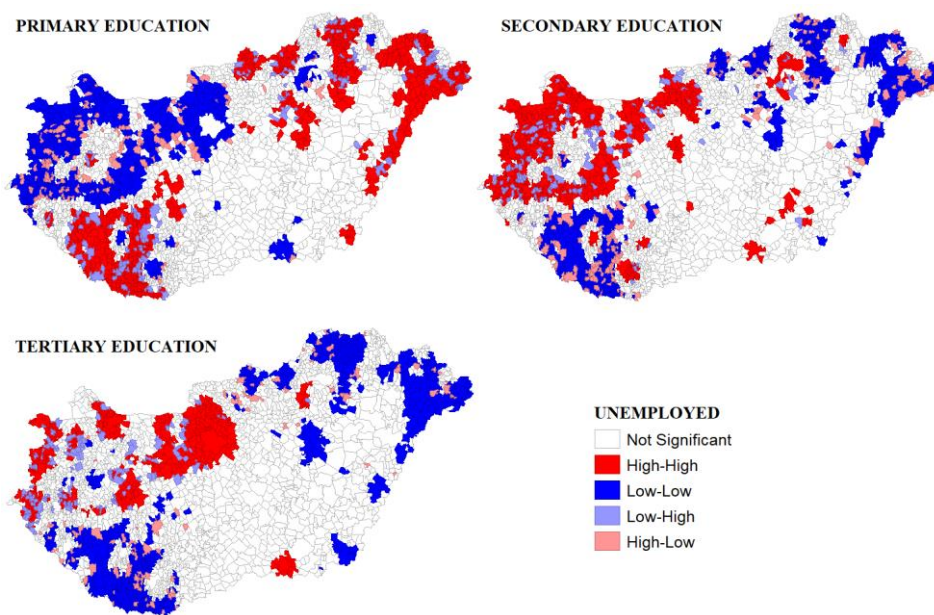


Figure 6. Clusters of unemployment concentration (2020)
(1) Own editing based on National Employment Service data

The clustering of the concentration of public employees by educational attainment is much smaller than that of the unemployed. The concentration of public employees with primary education has formed a hotspot in the western part of the country, covering the counties of Baranya, Somogy and Tolna (Fig 7). A larger coldspot was formed in the border areas of the North-Western part of the country. Comparing the groups, the spatial structure was similar to that of the unemployed. Those with a middle degree formed contrasting clusters, while the coldspots of those with an up-

per degree covered similar areas. In Baranya and Somogy counties, the concentration of public employees with tertiary education was below the national average. Only a minimal number of coldspots can be identified for public employees.

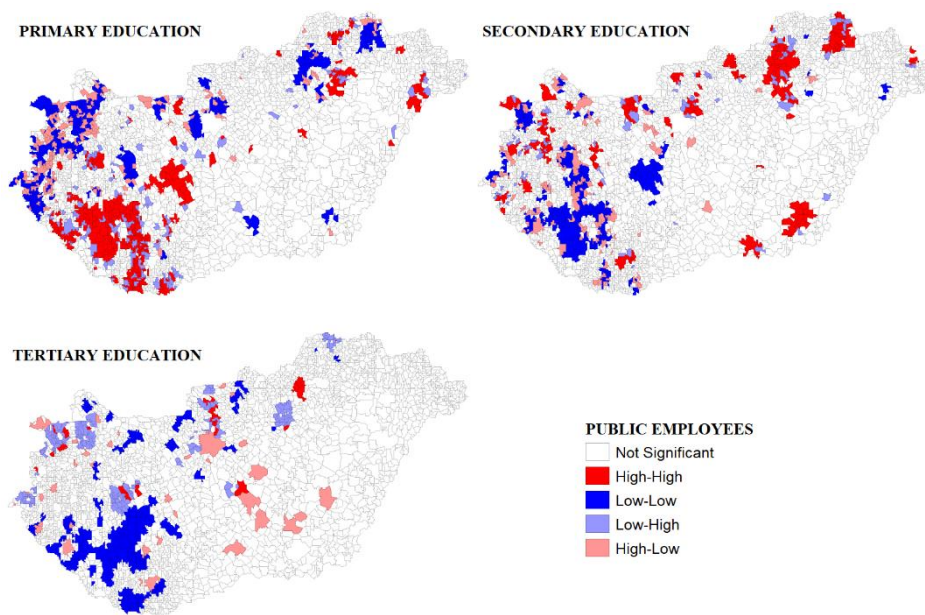


Figure 7. Clusters of the concentration of public employees (2020)
(1) Own editing based on Ministry of the Interior data

Conclusions

The analysis of the 2020 unemployment and public employment figures and concentration of the unemployed and the publicly employed highlighted the East-West divide in Hungary. In contrast to the settlements in Western Transdanubia, Central Hungary and Central Transdanubia, which have much more favourable economic indicators, the settlements in Northern Hungary, which was previously the worst off, and in the economically less developed Northern Great Plain, which has been heavily affected by the decline of heavy industry, have higher than average unemployment rates, and public employment is therefore of particular importance.

The spatial autocorrelation analysis showed a higher degree of clustering for the number of public employees. The spatial dependence of the number of unemployed and public employees is significant. A high degree of synchrony is found between Low-Low settlements. The analysis detected 844 settlements with both below-average unemployment and below-average public employment, and this is also true for neighbouring settlements. While only 38 settlements belonged to the High-High

cluster, most of them are located in the eastern part of the country, around Debrecen, Nyíregyháza and Békéscsaba.

Examining the concentration of unemployed and publicly employed people by educational attainment revealed sharp contrasts between the groups. The clustering of concentration by educational attainment is much higher for the unemployed than for the publicly employed. The spatial autocorrelation analysis of the concentration of unemployed with primary and secondary education confirmed the significant inverse spatial correlation between the two groups. The identified High-High and Low-Low clusters appear in an inverse manner. The same inverse correlation appears between the clustering of the concentration of public employees with primary and secondary education. The spatial structure of the unemployed and public employees by educational attainment in Hungary is strongly influenced by the "brain drain" phenomenon. The more qualified potential labour force is typically concentrated in the north-western and mid-western settlements and in Pest county.

I think it is worth extending the time frame of the research, depending on the availability of data. My further research on the spatial structure of the unemployed and the publicly employed will focus on examining the changes over time in the inverse relationships revealed by the present analysis, comparing them with the evolution of the concentration of the population by educational attainment.

Summary

This study explores the clustering and correlations of the concentration of unemployed and publicly employed persons by educational attainment in Hungary in 2020. The analysis has shown a strong positive correlation between the number and concentration of unemployed and publicly employed. The spatial dependence of the headcount data is plotted on a co-location map. The under- or over-representation of groups by educational attainment at the settlement level was explored by location coefficients. The spatial autocorrelation of the resulting concentration values revealed whether over-representation clustered in space. There was an inverse correlation between the concentration of unemployed with primary and secondary education for the 2020 data. The same inverse correlation was also found between the clustering of the concentration of the public employment with primary and secondary education. The spatial structure of the unemployed and public employees by educational attainment in Hungary is strongly influenced by the "brain drain" phenomenon.

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Examination of the publication lists of the Hungarian state treasury with regard to local farmers

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Abstract

The number of farmers in Hungary is steadily decreasing. At the same time, the number of resident farmers is also changing dramatically, with an increase in the size of holdings in favour of large and giant farms. The decrease in the number of holdings below 100 hectares results in a concentration of holdings above 100 hectares. In 69 districts the average size of holdings is close to the EU average. In terms of location, the concentration is concentrated in the Danube-Tisza basin, Nyírség, Hajdúság and the Szatmár-Beregi plain. In the districts of Mezőcsáti, Tiszafüred and Bicske, the average farm size for private individuals is above 50 hectares. As a result of the data, spatial inequality is eliminated in Budapest and rural areas and appears in districts where no spatial inequality and concentration of farm size is known.

Keywords

Single Area Payment Scheme, rural development, territorial disparities

Introduction

The number of agricultural holdings in Hungary is steadily decreasing, which is also reflected in the decline in the number of people applying for aid and in the concentration of holdings. The number of farms under 100 hectares is permanently decreasing to the benefit of farms over 100 hectares. This process is leading to shrinking of the rural areas' ability to support themselves through emigration and job losses. Furthermore, the disappearance of small and medium-sized farms is creating further problems for the rural economy. The change in the size of holdings in Hungary can be more realistically and illustratively measured on the basis of the published data of the Hungarian State Treasury, without the smallholder/holder/holder data which distort the published figures. By standardising the annual data, novel figures are presented to show the average size of resident farms and their concentration by district. The results provide the opportunity for novel findings in an area not previously studied.

Literature review

In Hungary before the Treaty of Trianon, 100 cadastral acres of land (57.5 ha) were considered large landholdings, but only 4,000 people with 600 ha were counted as large landholders in the 1895 survey of farms (BÍRÓ, 2010). According to MAGDA and SZŰCS (2002), the land tenure structure created by the land auctioned during

compensation in the early 1990s - an average of 2.88 ha per 1 landowner - is only sufficient to ensure that landowners are not destitute. The resulting dwarf holdings did not provide a sustainable existence and an acceptable standard of livelihood for the owners. As a result of this process, small and medium-sized farms were already at a competitive disadvantage after compensation and land concentration began. According to KÁPOSZTA (2016) and RITTER (2008), the adverse effects of regime change have been reflected in the transformation of the agricultural sector and the widening of territorial disparities. Agribusinesses that replaced large farms further simplified the production structure, reduced livestock numbers and employment, and reduced labour-intensive sectors, limiting opportunities for the local development (RITTER, 2014 and 2019). The restructuring of Hungarian agriculture is described by Kovách in an older study (2012) and a more recent one (2016). According to SWAIN (2013), former cooperative leaders in most countries have become green barons in the 1990s. As a further effect of estate concentration, integrator firms have become the most important intermediaries between farms, input producers, banks (and other financial institutions) and commercial firms (see KELEMEN - MEGYESI, 2007). The current land law, meanwhile, makes it considerably more difficult to start new farms with regard to land use and purchase. This problem of over-regulation is also reflected in foreign publications (see e.g. SWINNEN et al. 2014). Impact assessments show that about one third of CAP aid claimants farm up to 3 hectares. These areas represent only 3% of the total agricultural area in the EU-27 (KENGYEL, 2020). As a result of land concentration, a large number of agri-integration companies, ranging from 1,000 hectares to several 10,000 hectares, have been established in Hungary, in many cases with an investor ownership structure (BURGERNÉ, 2017). Other studies analyse the effectiveness of subsidies, such as the work of Pe'er et al. (2014), which finds that direct subsidies do not achieve their objectives. The dependency of land cultivation on subsidies, which has been observed in Hungary, has been investigated by several authors (including LIESKOVSKY et al. 2015, or RENWICK et al. 2013). According to these authors, the implementation of the CAP has led to a strengthening of large-scale intensive farming.

The largest share of subsidies is taken up by large farms, but the importance of subsidies as a share of total turnover is not significant, and as the size of the economy increases, the role of subsidies in both turnover and income decreases (POPP, 2002). Furthermore, large farms, which benefit from the bulk of subsidies, are unlikely to need income support as they have higher than average incomes and greater wealth (POPP, 2013). In the EU, the largest subsidies have been and are still taken by the most productive farms, which are gradually buying up small farms unable to benefit from technological improvements and intensive production (POPP - OLÁH, 2016).

The number of farms has been decreasing since 1975, and the remaining farms have become larger in terms of both agricultural area and farm size (EC 2013). Also

according to the 2016 census of the KSH, the number of individual farms has decreased by 12%, while the number of farming organisations has increased by 11%, as a result of the concentration of holdings. The entry into force of the new Act CXXII of 2013 (on the maximum size of holdings) has significantly changed the framework for farming. While the number of farming organisations and the area they use on land over 2,500 hectares fell by only one eighth between 2010 and 2013, the number of organisations fell by almost half and the area they use by 40% (KSH 2016). BURGERNÉ (2015), based on a statistical analysis of small family farms, concludes that the decline in the number of farms across Europe is mainly due to the disappearance of small farms and their merging into large farms. This is supported by the analysis of VALKÓ (2014) in Hungary and HUBBARD (2009) in Europe, which shows that the majority of individual farms that have disappeared are small farms. Their land was mostly taken over by large local farms.

For the pre-accession period, the economy of scale appears in some publications. According to GAZDAG (2003), in small and fragmented areas, it is difficult to develop an optimum of mechanisation, and therefore the profit margins of wage labour have to be paid. HUGHES (2000) argues that small farms - under 30 ha - are more efficient. GORTON et al (2003) find that the majority of commercial farms are more profitable than family farms. After the EU accession in 2004, the share of large farms increased slightly (from 59.7 to 64.7 percent), partly due to the European Union's Common Agricultural Policy (CAP), but also due to favourable domestic regulations (CSÁKI - JÁMBOR, 2013). This process was followed by a concentration of the agricultural structure and a reduction in employment capacity (MEGYESI, 2016). The distribution of direct payments is distorted geographically and by farm size, also in relation to the number of hectares or persons claiming subsidies (DG AGRI, 2011). Eighty percent of subsidies went to 20% of beneficiaries (GORTON et al. 2009). Also, Megyesi (2016) found that less than 5% of farms use more than 100 hectares of arable land, but these farms use more than half of the subsidised land.

Material and methods

Building on the findings of the literature, the research presented here first seeks to identify the identity of locally resident subsidy claimants and to explore the subsidy use of private households. By standardising the data, it is also possible to identify disparities between districts, average farm size and land use of non-local subsidy claimants. This will help to understand the concentration and uneven distribution of EU funds and the municipalities in which there are no beneficiaries. We have sought to find correlations that better illustrate spatial disparities and inequalities by taking into account the relationships between farm size by creating a new indicator. The use of farm size categories varies both globally and at EU level. While in European statistics, large holdings above 100 hectares are uniformly represented, in Hungary they vary from title to title, usually as a category of 300 or 1200 hectares.

The average farm size in Hungary, calculated on the basis of MÁK and KSH data for 2020, is 29.25 ha. The European average farm size was 16.6 ha in 2016, so it is reasonable to look at the farm size categories by a significantly reduced farm size category, rather than by the average of the whole population. In the current study, categories below and above 100 ha were defined.

The SPSS program was used to categorise the farm size and to filter the data by year from the subsidy payment data in the publication lists of the MÁK. Excel was used to average and perform the basic calculations. QGIS 2.18 was used to create a map representation of the data at LAU1 and LAU2 level.

Results

According to data from the Ministry of Agriculture and Rural Development (Figure 1), the reduction in the number of farms in the 2014-2020 period has affected small and medium-sized farms the most. In the category below 100 ha, 11045 holdings ceased to exist, while in the category above 100 ha, 1324 holdings were added.

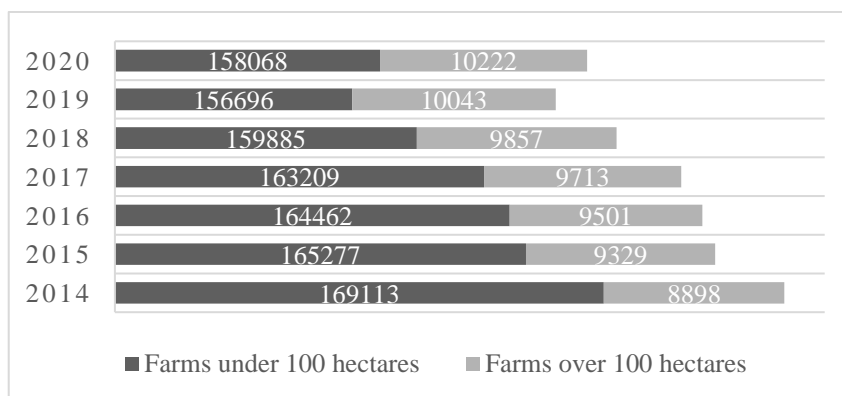


Figure 1. Farm size change 2014-2020
Source: own calculation and edition, based on MÁK data, 2021

The number of large and giant farms over 100 hectares increased from 8898 to 10222, which can also be called the successor of the farms below 100 hectares that ceased to exist, given the limited size of the arable land. The decline in the number of farmers is amplifying the exodus in search of new livelihoods and further concentration of holdings. Large farms of between 100 and 300 ha and over 300 ha use 72.1 % of the total area, but account for only 1.2 % of all farms (KEREK - MARSELEK, 2009). By processing the data from the MÁK, it can be concluded that in 2016 there were no private farmers applying for aid in 76 municipalities (Figure 2).

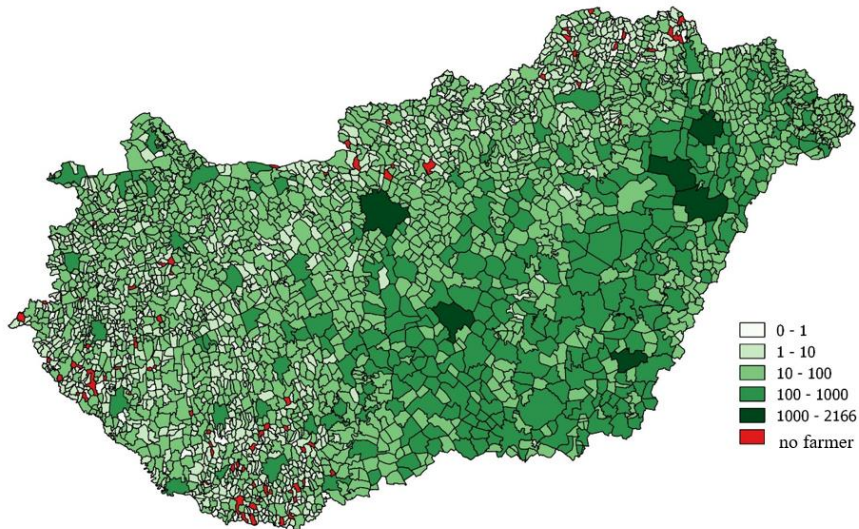


Figure 2: Territorial distribution of local farmers, based on payments in 2016 (main)
Source: own calculation and edition, based on MÁK data, 2021

The data are concentrated in the areas of North Borsod, Baranya county and South-West Zala. The settlements with less than 10 inhabitants are also concentrated, linked to the previous landscape units, complemented by the North-Hungarian Region and Vas County. The dominant role of Budapest and other cities and the agricultural character of the Great Plain can also be noted. For local non-individual claimants (Figure 3) (companies, foundations, associations, institutions, churches, etc.), the influence of cities is more pronounced and a similar spatial distribution to that of individuals can be observed. North Hungary, Vas, Zala and Baranya counties have a low number of agricultural enterprises.

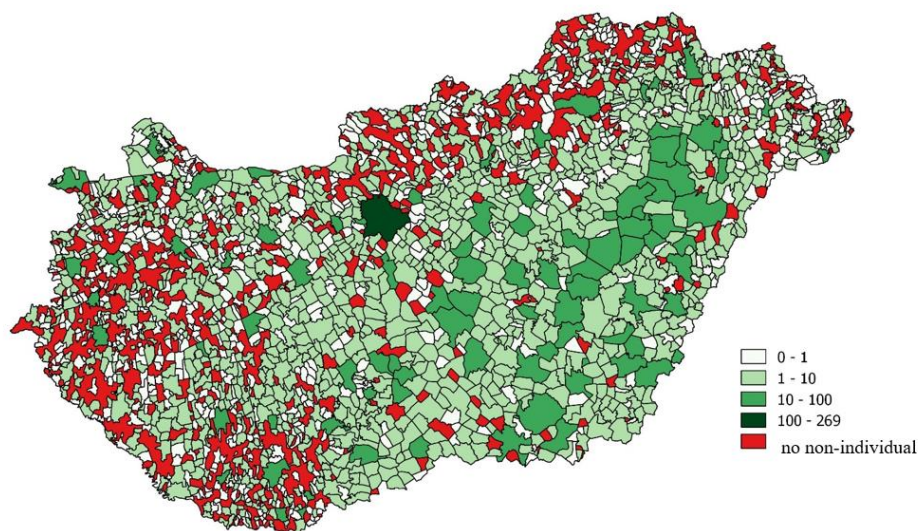


Figure 3: Territorial distribution of local non-individual aid claimants based on 2016 payment data (number)
Source: own calculation and edition, based on MAK data, 2021

By looking at the data in a new way, we can get a more realistic picture of the concentration of land and support in our practical experience. Public registration systems record a larger number of agricultural operators, masking the real situation. The new data produced from the publication lists give a more realistic picture of the number of farmers and the current situation of landholding concentration (LIPCSEI - RITTER 2020). By standardising and averaging the data, novel data have been calculated. In Figure 4 we have plotted the number of resident individuals per 100 hectares of eligible area at LAU 1 level. Using public Takarnet data, the size of the eligible area (arable, pasture, meadow, orchard, vineyard, garden cropping) per municipality is determined. By standardising the eligible area to 100 ha, we standardised the eligibility data for municipalities, excluding the distorting effect of forest cover or built-up area. Data determined using this method provide more accurate data than the previous annual statement. Its significance is reflected in the more pronounced presence of rural districts, the secondary nature of Budapest and the low number of indicators for some districts (Mezőcsáti, Tiszafüred, Bicskei). Thus the average size of the Mezőcsáti district is 62.5 ha for farmers living in the district.

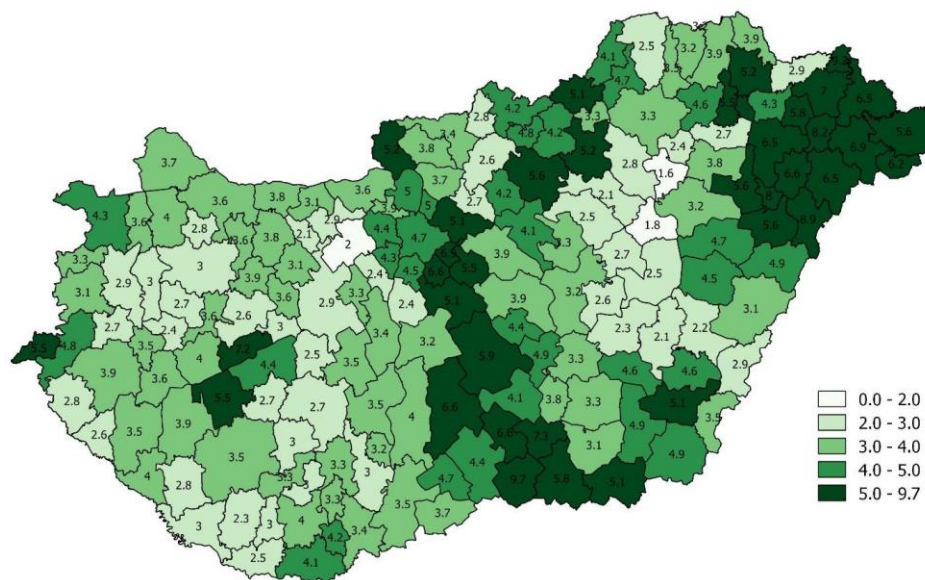


Figure 4: Average number of local farmers per 100 hectares of eligible area, 2021(persons)
Source: own calculation and edition, based on MÁK data, 2021

The data show that the Danube-Tisza Basin, Nyírség, Szatmár-Bereg Plain and Hajdúság have a more favourable land tenure structure for resident farmers. In the districts concerned, there are 5 or more persons per 100 hectares of eligible area, and the average size of holdings is thus 20 hectares or less. The majority of the districts are in the range below 4, with 69 districts in the sector above 4. The dominant character of the lowlands is not shown either, because they are characterised by concentration of holdings, land use by large agribusinesses and the non-localisation of aid applicants. This use of basic data provides more realistic data. If the European average is taken into account (16.6 ha), the dark green districts represent the EU level.

Conclusions

The number of farmers in Hungary is steadily decreasing. At the same time the number of resident farmers is also changing significantly, with an increase in the size of holdings in favour of large and giant farms. In terms of location, the concentration is focused on the Danube-Tisza, Nyírség, Hajdúság and the Szatmár-Bereg plain. In the districts of Mezőcsát, Tiszafüred and Bicske, the average farm size for private individuals is above 50 hectares. By standardising the annual data, no contrast between Budapest and the surrounding area appears, Budapest and its agglomeration can be investigated, and spatial disparities are observed in districts where no spatial disparities and concentration of farm sizes are known.

Summary

Exploring the effectiveness of the Common Agricultural Policy and evaluating current processes is a current challenge. The data from the publication lists of the MÁK provide new information on the territorial use of subsidies and on the size of holdings. The relevance of the annual data for resident and local non-resident aid claimants is significant. It also provides an opportunity to examine the land use of non-local grant claimants. Standardisation of annual data is necessary because of the irregularity of payments and spatial disparities. Data not yet published on the subject adds a different dimension to the subject. The number of resident aid claimants per 100 hectares of eligible area provides data for further analysis. A thorough analysis of the issue will provide real data in terms of farm size and EU resources, and we intend to contribute with a number of proposals for amendments to further develop and build the scheme in practice, in order to make it work more efficiently in our view. Overall, we have sought to highlight the spatial structure of the issue under consideration in relation to farm size and land support.

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Possible effects of autonomous AGBOTS ON RURAL SETTLEMENTS

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Abstract

Agriculture and developing of rural settlements could never been separated from each other. Till the 20th Century the main role of rural settlements were to provide food and agricultural products to societies. The mechanisation of agriculture radically changed this and nowadays only a minority of rural population is dealing with agriculture.

On the other hand, the usage of autonomous agbots became a reality in present days. Theoretically, this can eventuate the total elimination of traditional rural settlements. Practically, the change will be not so remarkable, but the only reason is that the majority of the rural population actually do not make their living (directly) from agriculture.

There will be introduced in a case study from the age of the mechanization of agriculture how can such (or rather similar) changes affect rural settlements, especially focusing on the number of inhabitants.

Finally, there will be introduced those group of settlements, which can be extremely vulnerable to this change, not by name, but by a selected group of special attributes.

Keywords:

autonomous agbot, rural settlement, dwarf village, extinction, technical-economic equilibrium

Introduction

Autonomous agbots are not simply drones, which can make the agricultural works with remote control, these machines can really work autonomously and on this way the human factor is negligible. The relevance of this can not be seen absolutely yet. The inventors can see and say only that the job can be done by the machine, the very hard work of a tractor driver is fulfilled from now on by machines.

The essence of this paper is the following: Similarly to the early 20th Century, when people thought that the invention of tractor will simply cause that pair of horses will be substituted by tractors and nothing else, but instead in 30 years or less the majority of agricultural workers left agriculture and the number of rural inhabitants started to decrease monotonously. This change/invention of present day can be the last step on this way and makes possible absolutely separating agriculture and the developing of rural settlements.

As we will see at the end of this study those hungarian small villages, which can be considered already endangered, are extremely vulnerable from this aspect.

Literature review

The literature of autonomous agbots is very new [1], [2], [3] moreover it is mostly can be found just like as a part of other topics. Ongoing research focuses on precision agriculture in present day. A problem, which can be considered to be solved, is the exact, cm accuracy localisation of agricultural machines and machine part. Such solutions are commercially available here in Hungary, just like RTK systems [4]. The actual focus is on agricultural data collection and mechanic data procession with so called AI systems [5], [6].

A collateral advantage of cm accuracy movement of tractors is the possibility that a contemporary tractor can make the work on the field without human contribution after reaching the given plot and fixing the coordinates of the edges and corners of the working area. This means *almost* autonomous behaviour, but a driver is still necessary to drive the tractor from the farm building (garage) to the field and the human driver has to fix the coordinates in the computer of the agricultural machine. Moreover, if any problem occurs on the field, the human driver can fix it (or we think that he can fix it).

The data collection related to agriculture seems to have no contribution to our topic, but those AI algorithms, which are used for data procession are still important, because AI can be used for other purposes either. Self-driving cars and their research is not closely related to agriculture, but those ongoing researches have a strong influence on agricultural vehicles either.

Great tractor manufacturing firms, just like John Deere [7], Claas [8] etc. [9] and smaller firms, even startups [10], [11] are actively working on autonomous agbot construction. The greater ones have already functioning models, which can be seen during work on internet videos [12], [13].

Considering rural settlements, the literature is huge. On the one hand there was a great emphasis on hungarian rural settlement, villages, but the literature is still huge. Luckily the applied methods helped to concentrate purely data, so basically KSH (Central Statistical Service of Hungary) data, and some KSH decision supporting research [14] were examined in detail.

Besides data from Hungary, the applied method required some data from world-wide [15] and from the other compared country, the USA. Luckily the statistical services in the USA and their member states are working quite well, so the necessary data [16] and information [17], [18], [19] could be easily obtained.

Material and methods

Essentially, this paper describes a comparative study. We compare two technological shifts. The later one is described already in the title: how the manned agricultural machinery will be substituted with autonomous agbots. The earlier one is that great shift that was caused by the appearance of tractors (with internal combustion engines) in the agriculture and how it expelled animal pulling power.

This earlier technological shift is already history in most countries. But it is very hard to find such a country, where this technological shift was free from distorting political aspects and the transition could have been seen in itself.

The invention of tractor happened already in the 19th Century [20]. But the widespreading of the tractor is important from our point of view. This event was different in almost every country and usually it lasted for many years everywhere. In general, it can be declared that from the 1920ties till the 1960ties this transition already happened in developed countries. Using the nomenclature [21] of the Cold War, this happened in the First and the Second World, regarding the Third World (present day developing countries) this is still an ongoing process. So, we should focus on the First and Second World in the first round.

In the second round examining the Second World (socialist countries) in a little bit more detail, we can see that in these single party led autocratic societies, the transition was not spontaneous, but it was ordered, usually a part of a five-year-long-, or ten-year-long plan. This ordered transition, usually paired with political persecution of smallholders is not suitable for examination.

Considering the First World (present day developed countries), most of them was strongly involved in the World Wars, so there were special circumstances, which also masked partially the phenomenon what should be examined. For example, although there were no ordered transition, but suddenly appearing huge number of workers (previously smallholders) in a war period is not a problem, because in such times armies can employ everyone, who is willing to be a soldier. So, western-european countries, and countries of the British Commonwealth (former British Empire) are not good example.

Finally, the remaining country is the USA. Examining that federal country in detail, the structure of them proved to be advantageous. There are more than 50 member states, although participated in World Wars, the country itself remained intact, moreover, examining in detail we can see that the previously mentioned transition happened between the two World Wars, so it was the age of temporary peace.

Further advantageous feature, that in this time the federal feature was more remarkably than today, the member states could be examined as very closely related independent states (economically) with very close relations.

Thus, we found a country where the agricultural technical shift from animal pulling force to internal combustion engine tractor can be examined without the distorting effects of any war or political regime.

Nevertheless, this focus is still not enough sharp. Considering the USA, it is a huge country, moreover it was never an agricultural country (excepting the southern states before 1865). After 1865 the USA suddenly started to develop into the most industrialized country of the world and 30 years later this country became the No. 1. in oil industry and became world leader together with Germany in steel industry.

But this sudden industrialization did not affect all member states. The most industrialized member states were the northeastern states (the traditional North), later California and Texas due to oil wells and huge industrialized harbours (San-Francisco bay and Houston). In a few decades all coastal positioned member states followed more or less in industrialization the North. Some other member states were in this time extremely underpopulated (Montana, New-Mexico, North-Dakota and basically the Rocky Mountain region).

From our point of view those member states are important, which can be found west from the Mississippi and east from the high mountain ranges of the Rocky Mountains. The member state, which is in coastal position in this area is Texas in the south. Moreover the oil industry was so suddenly developing in this period in Texas and the harbour traffic on the coast of the Mexican Gulf that this sudden development can mask almost any other kind of technological-economical shift excepting the Great Depression [22].

Considering North-, and South-Dakota in the north, those were so underpopulated that the agricultural sector could not be so well developed, moreover in this time the ethnic problems were so important here (here can be found some native american tribes which resisted for a very long time to the US Army). Furthermore, there are climatic conditions, which basically sets limits to the agricultural possibilities in these member states.

Between South-Dakota and Texas can be found three member states, Nebraska, Kansas and Oklahoma. These can be found in the so called corn-zone without remarkable industry (this changed only in the last decade due to the extraction of non-conventional hydrocarbons). These were already densely populated (relatively) and the number of the farms were quite great at the beginning of the 20th Century. So, these three states are very good examples from our point of view, moreover considering the economical structure and the number of inhabitants, these states are very similar to Hungary (agricultural countries) and comparable in number of inhabitants (millions).

The historical facts are the following: these member states can be found on the Great Prairie. This was originally a huge grassland, where many millions of buffalos were grazing and the local native american tribes lived on hunting them. After expelling the local native people, hunters came, who hunted buffalos only for their fur on this way in a few decades the north-american buffalo became almost extinct. The huge grassland were utilized then for cattle farming and this was the situation at the beginning of the 1910ties. As population grew, size of farm became little bit smaller and local plant cultivation (corn and some vegetables) started slowly increasing, but only for own/local purposes.

By 1920 a huge amount of tractors (about 600 thousands circa 30 hp strong agricultural machines) were sold in the entire USA, a huge percentage of them worked in these 3 member states. The immediate consequences was the sudden decrease of

horse breeding. Then came the balance shift between grazing animal (cattle) farming and crop production. With tractors it was possible to plow the prairie and corn and cotton provided greater income, then cattle in that time, till the Great Depression. The number of farmer families did not change in the following decade, in the 1920s. But it was important, that these farmers became highly dependent on the market, both considering the fuel prices, and the prices of agricultural products and raw material. This made them extremely vulnerable to sudden market changes, economic crashes.

Not only economic, but also ecologic vulnerability increased. The change from buffalo to cattle was not a real great harm for grassland ecology, although overgrazing was a permanent problem.

The direct consequence was the so called Dust Bowl [23]. Due to the plowing and the harsh climatic conditions over the Great Prairie (very strong permanent northern winds) very strong deflation phenomenon appeared and the upper soil layer were simply blown away in the form of huge dust storms. The southern member state, Oklahoma was mostly affected. The upper layer of soil contained most of nutrient, so the soil values decreased dramatically on a vast territory. Those farmers, who were affected seriously by this ecological disaster had no other choice than get credit from banks.

By the occurrence of the Great Depression, most of the farmers, especially smallholders have remarkable credit, tractor and agricultural machinery, moreover a crop producing farm. They had to buy in every month great amount of fuel, food and had to pay their interests...at the same time they could not sell anything because of the Great Depression.

In the following decade (1930-1940) these people used up all their savings, then had to sell their agricultural tools and farms and had to move to a place, where they hoped to have some work. Because of they know only agriculture, they tried to find job in such member states, where the agricultural sector needed huge amount of hired workers seasonally (orchards, vineyards mostly in California [24]).

Results

In these USA member states the population decreased between 1930 and 1940 with about 4-5%, respectively [25]. It is a huge number, this meant that hundreds of thousands left member states respectively, each had only a few million inhabitants. Considering the fact, that the number of inhabitants in greater cities (Kansas City, Oklahoma City, Omaha) did not change remarkably, this means that the rural land emptied, lost the majority of dwellers.

The agricultural land was not abandoned at all. Due to the bank credits and US regulation, banks became the owners tens of thousands of small farms. The abandoned farm buildings were destroyed and greater fields were created. On these greater fields greater tractors started to work, and the workers hired these greater

fields from banks (and naturally, they got credit to be able to buy even bigger and more expensive agricultural machinery).

After these event appeared that typical agricultural landscape, which is the main feature nowadays of the member states in the Middle West (vast fields without trees).

We can see that a technological step simply caused in the first step a new economic equilibrium considering the given sector. After the appearance of tractor, crop production became more effective on huge industrialized farms, than previously by smallholders. Using different regulation tools (if there is a political intention) the not so effective structure can be hold up (this happened later in the 1970ties in the USA under the Carter administration [26]) for a time, but periodically appearing economic recessions used to change political systems (not only in democracies) and after them in the recovery periods efficacy and competitiveness used to be the most important. A perfect example for this is described above.

Actually, here in Hungary we have an extremely vulnerable situation considering small and dwarf villages. The dwellers here lived originally only from agriculture. We have to add, that the mechanization of agriculture happened in Hungary much later than in the USA, only at the end of 1950ties, under a socialist regime [27]. So, by 1959-60 the structure of agricultural production was that original animal pulling power based sector. The first wave of emptying these villages came in the 1960-70ties [28]. Actually most of them have only retired dwellers and a few agricultural workers, who run a few greater farms on the territory of the settlement.

Among these circumstances, such a technological step, which eventuates that those few agricultural workers are not necessary any more for running these farms, can cause that only retired persons will live on these settlements, which is a straight way of the extinction of the given villages. According to the Hungarian Central Statistical Service, based on 2011 data, „13% of the hungarian settlements have less than 200 dwellers, the total number of their inhabitants is less than 0,5% of the total hungarian population” [29].

This 13% means about 400 settlements! These do not have any other attractive forces than agriculture, that is why they remained so small. None of them is a newly founded settlements, so none of them is in the growing phase.

Even assuming that the technological step will not cause such a wave in number of rural inhabitants than that previous one (introducing the tractor as main pulling power) it can not be a reason for being satisfied, because there is no need for 4-5% change in the total population number, only 0,5% is enough (in an order of magnitude smaller) to absolutly empty these 400 (!) villages.

It is not worth to assume that such technological change will not affect remarkably the structure of hungarian agriculture. We have to keep in mind that the present structure is hold up on the one hand by European Union Agrarian Policy, which last only by 2027 and no one can know, what will be later. The other holding

arm is the hungarian regulation, which is based on an act erected in 2014. But, as we can see, a great economic crisis can eventuate change in government, parliament and soon after regulations.

At the same time, if we compare two harvesters in high-season, one of them goes 24 hour a day, 7 days a week and the loan of the driver does not have to be paid, while the other harvester works only by day and at least two workers's loan has to be paid. It is unequivocal that the first harvester is far more competitive than the second one, and this can not be changed by any regulation, or subsidy.

Conclusions

Technological change eventuates that actual economic equilibrium turns suddenly from stable position into unstable. The inertia of the economy and the society will keep up the old structure for usually years, even decades but the competitiveness and efficacy of the given society continuously decreases during this time. Then comes usually a sudden change (an economic recession) after which the traditional structure can not be hold up anymore despite any political, local, society, traditionalist intention. The recovery of the given sector, or the given economy happen in the appropriate new structure and it goes in till its limits, or till a new technological step. This happened in every agricultural sector, where tractors were already substituted animal pulling power. We are facing now with a new technologic step, the autonomous agbots, but we do not feel yeat its effects on the agriculture and the society and rural lifestyle.

Summary

In this paper is shortly described a current technological shift that can affect seriously agriculture and also rural lifestyle and settlements. The prediction of such an affection can not be done exactly, but we made a comparison between the actual change and a previous one, which also influenced the agricultural sector, moreover on a similar way, by decreasing the necessary number of human workers and increasing the demands for technological tools.

As we seen, that transition on the 20th Century was a huge impact on rural societies and settlements, not only on the agriculture. Considering the present day impact, probably its effect will be smaller, but we can also see, that especially in Hungary the rural societies and settlemenst are far more vulnerable, than they were in the middle of the 20th Century, especially the small and dwarf villages.

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Knowledge transfer and blended learning by intergenerational farmer pairs

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Abstract

Knowledge transfer is an old priority for knowledge generators as over a century ago universities were concentrating on their extension activities to answer the needs and expectations of the society they were serving. The paper sums up the observations and the learning points of a recently finalised project employing a new approach for the particular benefit of the small and medium farms, agricultural households included. The novelty of the approach consists of pairing older generation farmers rich in local knowledge and experience and younger generation farmers more skilled in the use of the modern and digital technologies and by the intermediate of facilitators assist the exchanges inside the pairs for mutual benefits. Further the pairs are clustered according to their experience in the use of digital technologies and exposed to a number of applications and exercises facilitating the gain of new knowledge and helping them master the new digital tools. The pandemic crisis forced the delivery that was planned to deploy face-to-face into a blended learning framework using support platforms and synchronous online applications for the delivery of the trainings. This initially unplanned dimension challenged the methodology and led to an even higher level of results validating the proposed approach as a new way of delivering and fostering the knowledge transfer.

Keywords

paired blended learning, digital, applications, small scale farming

Introduction

Knowledge transfer represents one of the priorities for the scientific outputs for over a century already beginning with the first efforts to extend the university results beyond its boundaries by university extension. Nowadays the technological transfer is structured as a specialised lab linking to the industry or business forerunners and acting for the mutual benefit of all players. Agriculture is no exception from the process particularly in the case of the large and specialised farms with consistent dimensions of the technological driven investments. Knowledge transfer,

other than packed with the technological novelties, instruments or machinery is often parked on the side and left for the education institutions, extension and consultancy structures or other interested actors. Although a potentially high priority even through the Rural Development Programmes, the interest and the implementation does not lead to sound results, such as in the case of Romania where the overwhelming majority of small farmers and agricultural household heads have only practical knowledge (learning by doing). The highest need for knowledge transfer is coupled with the smallest size and specialisation degree in farming. Bottom line, in practice there is a large number of potential recipients, with a high demand for training or other forms of knowledge transfers, farming on relatively small farms or agricultural households and benefiting only from standard training programmes with low frequency, small number of attendees and usually targeting the top technologies that rarely apply to the participants. The proposed approach of the observed project WiseFarmer couples the small farming and their needs with the observation that usually the older farmer generations are rich in local knowledge and experience while rather isolated from the modern communication technologies and the digitally supported applications or instruments all-while the younger farmer generations are well and extremely well skilled in the use of ITC and digital tech yet with a lesser level of local knowledge and less experienced. Therefore, a first iteration targets an enhanced way of transfer between the generations while the second stage is digitally supported by a selection of useful, easy to access and where possible, free applications meant to enhance their farming practices.

Literature review

Considering the novelty of the approach it is difficult to isolate the relevant literature references in strict relation to the selling points combination that led to the successful validation. Corrigan indicates proofs of intergenerational solidarity effect and impact by social interaction. Findsen highlights that while intergenerational programmes have the potential to foster learning some initiatives make learning objectives central to their mission and objectives. Intergenerational learning initiatives increase cooperation, interaction, or exchange between any two generations, and moreover they need to involve the sharing of skills, knowledge, and experience according to Ventura. Clear objectives lead to strong outcomes states the Learning Through Intergenerational Practice of the Generations Working Together. Kaplan captures a number of new initiatives emerging which aim to bring young people and older adults together in various settings – to interact, stimulate, educate, support, and provide care for one another.

Material and methods

The basic method employed on this paper relates to observation over the facts and finding during the implementation of the identified approach within the frame of the

WiseFarmer project. The materials are compiled from the primary project data occasioned by two sets of field survey, primary data from internal evaluations linked to each intellectual output, the satisfaction surveys and the feedback from the participant farmers and facilitators and from all secondary sources used to shape and deploy the activities and interventions. The entire pack of input information and data is analysed for extraction of learning points and further potential adjustments in the use of the training method.

Results

The original proposition of the project intervention was based on intergenerational paired learning beginning from two core facts: farmers reach a higher level of knowledge transfer when they learn together and they communicate with each other using the common farming language and, the older farmers have more local farming knowledge and experience while having fewer digital skills and the younger farmer generations are far more skilled in digital tools and applications yet with lesser experience and local knowledge about farming. An extra-layer was applied aiming primarily at small and medium farms and agricultural households, observed as less covered by the focus of various channels of communication and less linked to the knowledge flows. After the first quarter of the implementation a supplementary and heavy challenge was forcefully applied: the lockdown and the pandemic restrictions in terms of public health. Since an important part of the activities were planned to be supported by web platforms and online applications, the project methodology graduated to "online paired intergenerational learning" considered not only fit to the situation yet the only continuation strategy considering the circumstances. We cannot extrapolate and virtually measure the success of the intervention if the project was implemented mainly by face-to-face and in-person assisted learning as the surroundings only allowed few such moments. However, considering the level of the achievements, the feedback for the participants, facilitators and implementation partners, the estimates are that the current format is highly suitable and flexible being able to successfully pass over different types of restrictions, including distance or physical presence constrains.

The analysis of the project implementation leads to the discovery of several learning points all interconnected and requiring strong correlation:

The **content** must answer several appealing criteria in terms of content-shaping considering that the accustomed public, in this case referring to the younger farmers, have already a certain level of online consumption. The information provided must shaped according to the modern tech making it attractive visually and comparable when paralleled to a news site, web-media or other popular online platforms. The educated choice of the project partners, based on a long practical experience within the frame of other projects indicated the drop of static presentations such as the old-style PowerPoint and static-rigid Learning Management System platforms

such as Moodle to a more dynamic set of novel replacing solutions. The content itself was subject of careful weighting involving extension agents, academic staff and making use of all available present or previous sound experiences. The end-product had therefore the pass a double-check both in terms of content and shape and answer the nowadays expectations in digital consumption, the sustainable use, and potential future transitions.

The **support platforms and applications** choice benefited from the same verification as the content in terms of appealing to which extra-criteria were added: availability, accessibility, and relevance. The availability refers primarily to a consolidated version of the solution where a history of previous existence and improvements were critically important. The accessibility was linked to the open access, preferably free access to the content and services and where no particular knowledge was required to setup and operate the full set of facilities, or expensive and dedicated hardware needed to provide the basic functioning. Also, the cross-platforms availability and the portability of the platforms and applications were checked as pre-requisite of the selection process. The relevance feature points to the core nature of the service and its dedicated output for the designated use sequences, such as mailing, VOIP, learning environment or mapping and navigation. Important to highlight here that OneSoil application (Figure 1) got so popular among the participant farmers in Hungary so that the project leader and the partner decided to propose to the application developer the localisation for Hungary. This step was successfully completed with the involvement of the Hungarian project leader and staff aided by extension agents and academic staff (Figure 1 bottom-right). The field used as example in the Figure 1 is randomly chosen near Szarvas for illustration purposes although the location is not arbitrarily set in the current paper and indicates NDVI and Contrasting NDVI readings in different seasons and years (top-left, top-right and bottom-left). The interest of the farmers and the readiness of the project team and facilitators led to the adaptation of a worldwide application proving that even in small scale agriculture the demand can shape the product.

The **assistance and facilitation** during the learning period appear to be critical to success as regardless the quality of the tools and applications and the interest of the participants in absence of a valid and trusted vehicle the knowledge has poor chances for transfer. Since the interest expression was consistently high as the enrolment process was freely organised on the project's platform the facilitation and assistance had to answer accordingly. To this purpose the facilitators were selected among the extension agents, trained as facilitators and provided with a toolset and a solid reference handbook on facilitation for the upcoming training sessions. The facilitation process acts as a transitory or translation phase linking the potential results and benefits with the purpose of use by the intermediate of humans and comes accompanied with explanations and examples easy to understand and accept. This

step is critical for the further exchanges between the young farmers and older farmers where local knowledge helps placing the usefulness and digital apprenticeship boosts the common adoption of the tested and validated tools.

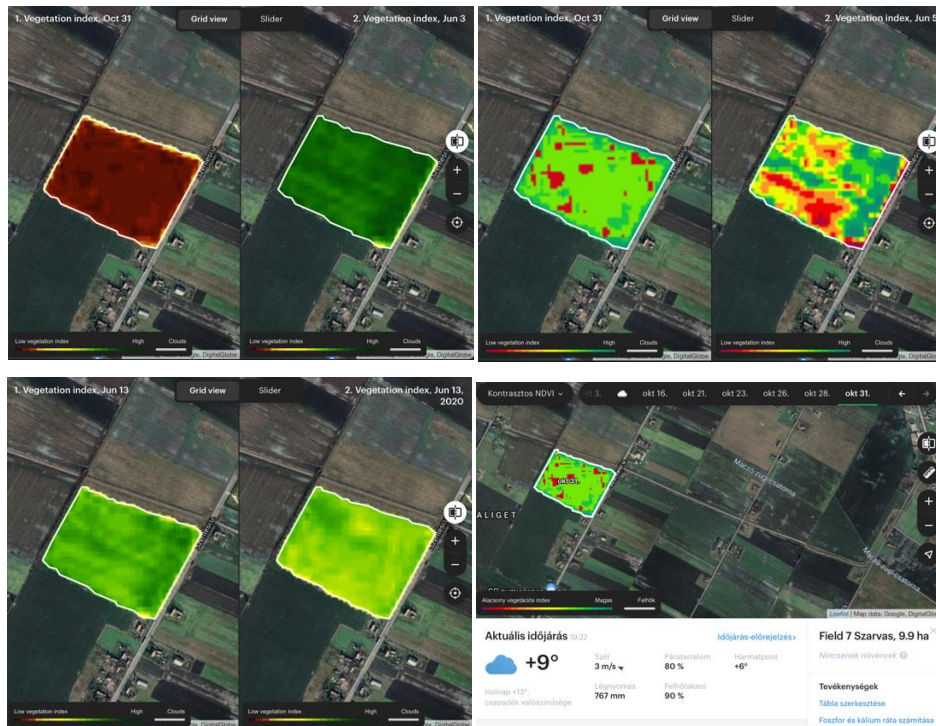


Figure 1. Captures from OneSoil application, now also translated in Hungarian language; NDVI filed image sample (top-left), Contrasting NDVI filed image sample (top-right), NDVI filed image sample at one year time difference (bottom-left), field sample with weather data (bottom-right)

(1) <http://www.onesoil.ai> (2) <https://app.onesoil.ai/@46.8407,20.5567,15z/fields/o4407298>

The **constancy of communication and exchanges** helps linking different intervention and delivery moments with continuation of use for different applications and platforms on one hand and represents the base of transport for questions and answers needed to consolidate the trust granted to the new tools and their contribution to the ordinary farming activities. This continuity was planned during the early programming stages and properly implemented and supported by the facilitators and project staff. Constant use adds to the practice record and where the interest is validated it can reach the chance to convert into a routine action with all the benefits the respective tool was designed to generate.

The **knowledgebase** represents the growing referential storage grouping relevant content in the most digestible way and open to the farmers connected to the learning platform and base. The use of video format to share experiences, explain

processes or changes and show easy to read and understand results proves to be highly efficient and generate a solid impact, making it the preferred delivery type of media. The knowledgebase completes the portfolio of tools and elements of such a type of approach and its popularity might transform it into the best-selling point for newcomers. Supplementary to the specific content of the knowledgebase an Inventory describing all the stages, actions and achievements of the project is translated and published in English, as project requirement for further international dissemination, Croatian, Hungarian, Serbian, Slovak and Romanian languages.

A critical element in training farmers one that qualifies for the first chapter and first paragraph of any textbook in the field is the **timing**. The delivery moments and their lengths need to prove flexibility and the ability to maintain coherence when fragmented. Also, the time-availability of the farmers along seasons, months and even days is highly influenced by the production type, region, market requirements and even private life adding an extra charge to group planning. Considering the extra-challenge for the project with forced online delivery for certain stages of the learning process the observations indicate a high elasticity of the projected content, teams and moments adding to the success of the implementation.

Conclusions

Knowledge transfer as blended learning by intergenerational farmer pairs was proposed as a novel method aiming at a higher impact of the digital technologies in the farming communities and is validated by the impact and results recorded during the project implementation. The interconnected learning points: **content, tools - support platforms and applications, knowledgebase, process - assistance and facilitation, constancy of communication and exchanges**, and **timing** reach a new dimension when online delivery compensates for the lack of mobility and forced distances. The newly packed and validated method has high prospects of spreading as universities are institutionalising the practice and incorporating the method into the teaching materials. Furthermore, prospects are favourable to the deployment of wise facilitators enabling the existing extension agents or bringing new players at stake. The pressure induced by the public health crisis and the pandemic situation led to challenges in learning process worldwide yet one of the *a priori* most refracting sectors proves to take the lead when proper approach is set in place.

Summary

Knowledge transfer represents one of the priorities for the scientific outputs for over a century. The basic method employed on this paper relates to observation over the facts and finding during the implementation of the identified approach within the frame of the WiseFarmer project. The materials are compiled from the primary

project data occasioned by two sets of field survey, primary data from internal evaluations linked to each intellectual output, the satisfaction surveys and the feedback from the participant farmers and facilitators and from all secondary sources used to shape and deploy the activities and interventions. The central learning points from WiseFarmer experience validating the knowledge transfer as blended learning by intergenerational farmer pairs, online included as part of blended, indicate a close correlation and a high adaptability in terms of: content; tools - support platforms and applications, knowledgebase; process - assistance and facilitation, constancy of communication and exchanges, and timing.

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Methodological differences in the education of generations

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Abstract

The methodology of adult learning has changed significantly. Today, it is no longer possible to consider a homogeneous group of trainees with significant age differences, basic skills, prior knowledge, and motivational levels. Adults from different backgrounds benefit from learning through diverse methods and tools. Digital technology, changes in time management, and the specificities of changes in information processing require new delivery practices for adult learning. In our research, we explore the viewpoints of adult education institutions, adult education professionals, and the people involved in adult education to make digital technology as effective as possible in adult education. Our study provides insights into the situation of adult education enterprises in Békés County, the needs and learning habits of adults.

Keywords

adult learning, differentiated education, digitalisation

Introduction

This research explores the specificities of teaching different generations in out-of-school education. We examined the tools and methods that are useful for teaching the different generations and how adult education institutions and their trainers have the technical equipment and methodological knowledge necessary for the successful implementation of this process. We also sought to find out whether it is appropriate to teach adults in an integrated or segregated way.

The research was carried out by the Employment, Labour and Occupational Health and Safety Department of the Office of the Scientific Council of the Békés County Government Office and the Kodolányi János University between November 2020 and April 2021.

Literature review

Both generational research and adult learning techniques have a long tradition at international level. Countries with a long tradition in adult learning research include Estonia, Finland (Skorobogatov, G. 2015) (Jogi L. – Gross M. 2009) (Larissa Jögi, Margarita Teresevičienė, Tatjana Kože & Arne Carlsen 2018) (Irja Blomqvist - Timo Ruuskanen-Helena Niemi - Eeva Nyssönen 2000). Generational research has gained momentum since the 2000s, which includes categorising generations, their characteristics and analysing them in terms of activities. . (Brandy, Henry E. – Laurel

Elms 1999) (Windship, Cristopher – David J. Harding 2008) (Dinas, Elias – Laura Stoker 2014)

Material and methods

The secondary part of the research will look at the structure of education in Hungary and the main characteristics of the generations that are now together, including their attitudes towards technology and their learning habits.

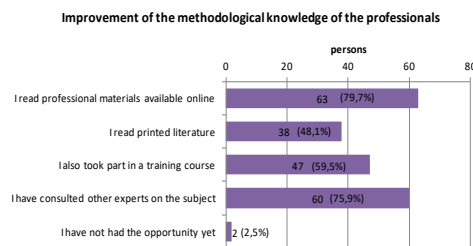
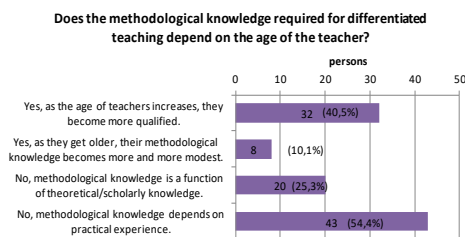
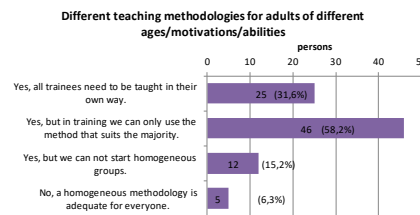
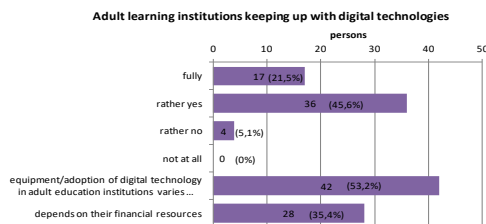
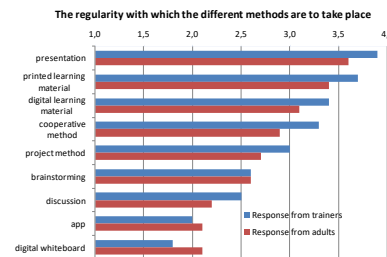
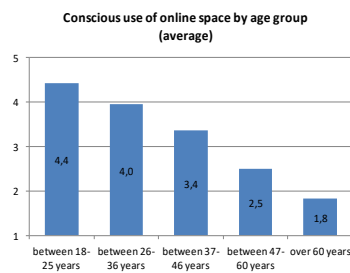
The primary research was carried out in Békés County using online, voluntary, and anonymous questionnaires. Covering the spectrum of adult education, the questionnaires were targeted at three target groups, with 68 adult education workers, 11 adult education experts, and 239 adult education participants completing the questionnaires.

The questionnaires specified for the target groups started with demographic data. The experts shared their experiences on, among other things, the use of the online space by adults, the tools/methods used in adult education, the capacity of trainers to deliver differentiated training, the possibilities of simultaneous training for adults of different age groups, and/or with different motivations/abilities, the digital transformation of adult education institutions. The participants in the training answered questions on their learning habits, their attitude towards digitalisation, the tools/methods used by the training institutions, the consideration of their individual needs.

Results

- Feedback from adult learning professionals shows that the conscious use of the online space is prominent in the young age group, but declines from the age of 40 onwards, presumably also due to a decline in ICT skills.
- Instructors use print and digital learning materials relatively often, but digital whiteboards and apps are not yet available in adult education in significant numbers. Methodologically, frontal teaching is dominant, as opposed to cooperative and project methods, discussion, and brainstorming.
- Tracking the development of digital technologies by adult education institutions is less problematic, but the attitudes and equipment of adult education institutions towards digitalisation are very different.
- The methodological knowledge required for differentiated teaching is less dependent on the age of the instructor and develops more with individual learning and experience.
- Adults of different ages, motivations, and abilities need different methodologies. Even though the vast majority of respondents agree with the need for differentiated methods of teaching, around 60% of them believe that only methods appropriate to the majority of trainees are used in their teaching.

- The majority of trainers are improving their knowledge of teaching methodology, with online professional materials and face-to-face consultation with other colleagues leading the way.
- It is possible and useful to develop a benchmarking tool that can determine the digital awareness and digital skills of trainees entering the training. The assessment can be effective if it can be accompanied by appropriate competence development.



Source: own editing based on the authors' own research

Conclusions

Although our research was carried out in Békés County, and the time, material constraints and the pandemic situation did not allow for personal interviews and representativeness, we believe that the results can identify targets for the development of adult education and provide a basis for future - more in-depth - research. We consider it necessary to develop a system for measuring adults' digital awareness and digital literacy, to support the identification of learning pathways that take into account individual needs and skills. There is also a need for targeted development of the digital skills of those entering adult learning and support for the digitalisation transition of adult learning institutions. In addition to developing tools, the latter should also include the development of digital learning materials and the training of trainers in the use of modern teaching methodologies.

Summary

The future belongs to adult learning that is tailored to individual needs, adapted in time and methodology. The future direction of adult learning will be to develop a different methodology for different generations, using tools that can be tailored to generational/informational awareness. The information must be made available at different technological levels and the entrants must be empowered to receive it.

It is useful for trainers to create an adult education channel that also supports professional, methodological knowledge, where they can continuously learn the communication techniques, tools, and methods required by the generations.

For those entering adult education - and especially for adult education institutions and organisations - it would be useful to develop a 'test' to identify digital skills and abilities, which would help in the selection and application of the appropriate methodology.

Supporting the will of adult education institutions and the knowledge of those working in education, it is necessary to help those involved to develop and continuously update digital learning materials in line with the requirements of INDUSTRY 4.0 and to provide the technical conditions for an appropriate combination of onsite and offsite-present education in line with 21st-century requirements. The epidemic situation has generated methodological tools - mostly of the blended-learning type - in adult education institutions, the use of which is appropriate and useful for the future. This type of training is time- and cost-saving and its effectiveness can be adequate if it is complemented by appropriate face-to-face consultation and practical training.

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Analising local product consumption In the Kecskemét micro region

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Abstract

The European Union and national rural development prioritise the production and consumption of local products. To achieve this, subsidies are paid to ensure that small-scale producers' goods reach consumers in the greatest possible numbers. However, the question arises whether consumers prefer locally produced products. The main objective of the primary research presented here was to explore consumer habits in the Kecskemét district. The research covered, among other things, the sources from which consumers obtain their general food products and the proportion of these products from local producers. Another objective was to investigate the extent to which consumers' purchasing habits are influenced by price, quality, environmentally friendly packaging, place and method of production. The aim of the research is to briefly explore how much current purchasing habits in the Kecskemét district favour small-scale producers and short supply chains.

Keywords

local products, agriculture, consumer habits, rural development, short supply chain

Introduction

Among the objectives of the EU and Hungarian rural development policy, high priority has been given to the marketing and distribution of local products. Its support in rural development programmes is steadily increasing. Rural resilience and development opportunities in disadvantaged areas can be improved if a local producer can sell his product nearby. However, in many rural communities, selling products produced using artisanal methods cannot guarantee a secure livelihood. It is important to underline that the barriers to marketing local products are not only caused by the lack of producers/producers. As a consequence of the price-depressive effect of the large multinational super and hyper markets, smaller producers and manufacturers are being squeezed out of the market or their market position is being increasingly eroded. Local producers who sell their products to buyers have long been in a vulnerable position, as buyers have a strong influence on the purchase prices. Producers who sell their products on local markets are also in a vulnerable position, as they have to compete with the prices of supermarkets and hypermarkets. The latter can only rely on the survival of the old "market shopper" habits.

Based on this, the main objective of the primary research presented here was to explore the shopping habits in the Kecskemét micro region. The research covered -

among other things - the sources from which consumers obtain their general food products and the proportion of these products from local producers. Another objective was to investigate the extent to which consumers' purchasing habits are influenced by price, quality, environmentally friendly packaging, place and method of production. The aim of the research is to provide a snapshot of current consumer habits in terms of their focus on producer products.

Literature review

The definition of a local product is not an exact concept. Each country has its own definition and set of rules for interpreting local products. In Hungary, the National Chamber of Agriculture's formulation is the most appropriate definition of a local product adopted in the domestic legal relations system: "*its main characteristic is that the production, processing and marketing and the consumer are as close as possible to each other, the supply chain is short. However, the distances may vary, depending on the product, the region and the circumstances. It is important that the circulation of local products and the strengthening of the demand for local products develops the local economy, helps and supports local actors and leads to sustainable farming in environmental and social terms*" (Szomi, 2016: p. 2.). Local products are mainly sold within a radius of 40 km and play an important role in local economic development and even in public catering. They are also characterised by the fact that there are not many traders between the production and sale of the product, the vast majority of them being sold by the producer himself or at most with the help of a trader. This brings us to the issue of short supply chains.

The short supply chain (hereinafter SSC) develops and operates a new or improved form of marketing in cooperation with farmers, involving at most one intermediary, which becomes a regular form of sales for its members (Reszkető, 2015). One of the advantages of SSC is that there is no or at most only one trader between the producer and the end user. The consequence of this is that the customer can even get a better price for the producer's product and the producer can sell his products with a higher profit. An earlier study by the OECD (1995) also identified SSC as one of the potential development opportunities for areas or rural peripheries. SSC can be a solution for both smaller and larger producers, as the increased revenues can make the financial balance sheet of businesses more secure (Benedek, 2014). According to Balázs and Simonyi (2009), there is also an increasing willingness to buy locally produced products based on familiarity and local knowledge. The actors of SSC sales and marketing channel are an autonomous organisation whose purpose and function is to sell the goods produced through as few intermediaries as possible (Kotler and Keller, 2006). According to Póla (2014) SSC sales include: door-to-door sales, roadside sales, pick-your-own promotions, sales and delivery at producer points, local product buying circles, consumer associations, internet sales, sales at events and sales of local produce during rural tourism.

The increasing role of SSCs raises the need to investigate the proportion of products that consumers purchase directly from producers (or from which commercial sources they purchase from non-producers) and the proportion of consumers' purchasing decisions influenced by, for example, the price of a product, its quality, personal relationship with the producer, information available about the product. The research presented here focuses on answering these questions.

Material and methods

The aim of the primary research presented here was to find out what products do consumers buy from local producers and local markets, and what proportion of the different food products do they buy from local producers, markets, local shops and supermarkets. How satisfied they are with the quality of local products and how important it is for them to buy from a place that is a traditional (multi-generational) seller. The paper focuses on the district of Kecskemét because of an ongoing PhD research in the same area. As methodology a population survey was used with three hypotheses based on the literature and our previous research experience:

- H1. The consumers surveyed are generally careful to buy Hungarian products.
- H2. Respondents are generally willing to pay more for a proven Hungarian and local product.
- H3. Respondents are more likely to buy products that come directly from producers or from local markets.

Due to the Covid situation an online questionnaire survey was conducted from January to April 2021 in the district of Kecskemét. A total of 499 completions were achieved which provided useful information. The questionnaires were anonymous. We present here only the results of the research most relevant to the topic.

Results

Over 86% of the participants in the study were aged between 26 and 65 years, the 56 to 65 age group represented 23.6% of the sample, while almost 10% of the respondents were over 65. This suggests that the older generation will be present in the virtual space in 2021, which is likely to have been influenced by the pandemic. At the same time, more than 50% of respondents were aged between 26 and 55. The proportion of women and men surveyed was 81% and 19% respectively, which is an advantage in that women are the main ones who are involved in food shopping.

The respondents can be divided into two major groups when looking at their educational level. College or university graduates accounted for 44% of the respondents, while those with a vocational or high school education accounted for 38% of

the sample. The proportion of respondents with a primary school education was 4% and the proportion with a vocational education was 14%.

In terms of the distribution of respondents by occupation, the highest proportion of respondents was in the intellectual occupation with 51%. This was followed by physical occupations (20%) and pensioners (19%), students/students, unemployed persons (5%) and housewives (5%).

2% of the respondents prefer foreign products to Hungarian products, and 16% of those who do not pay much attention to the product they buy - whether Hungarian or foreign. However 82% of respondents indicated that they consciously buy Hungarian products.

We investigated the proportion of respondents who would be willing to pay more for Hungarian products if they were guaranteed to come from Hungarian producers. The results show that 15% of respondents are not willing to pay more for a guaranteed Hungarian product. The next group (33%) was those who would be willing to pay up to 5% more. 30% of respondents would be willing to pay between 6% and 10% more, while 14% would be willing to pay between 11% and 15% more and 6% between 16% and 20% more for a Hungarian product. However 7% of respondents would be willing to pay more than 20% more for a guaranteed Hungarian product.

The results show that 0.4% of respondents generally buy food online, helped by the fact that nowadays all supermarkets offer online ordering and delivery, in the context of the Covid-19 pandemic (Figure 1.). This rate is surprisingly low given that face-to-face contact was avoided during the pandemic. 4% of respondents generally buy their food products directly from the producer/household. The sample included 7% of respondents who mainly use local small shop sources and 9% of respondents who most typically buy their food products from the local market. 40% of respondents generally source their food from other international chains (e.g. Lidl, Aldi, Penny, etc.), with a further 23% preferring supermarkets (Auchan, Tesco, Metro, etc.). Purchasers from domestic chains (Coop, Real, CBA, etc.) accounted for 15% of the sample.

In the next set of questions we asked respondents to treat their answers as if they were comparing the characteristics of a product. Respondents were given the opportunity to rate their answers on a Lickert scale.

The least important characteristic was the personal relationship with the food producer, which produced an average score of 3.7. Another less important characteristic for respondents was buying from the same customer for several generations. The following characteristics, such as products with a local product label and environmentally friendly packaging, produced an average score of 4.3, which is more in the less important category. However, contrary to the results of the literature references (see Nagy, 2019), in the present study the importance of the price of the products was not particularly high. With a score of 4.6, respondents rated the importance of environmentally friendly packaging and the importance of discounts/deals as almost equal. The three most important characteristics for consumers when buying a product are that they receive reliable information about it, that it comes from Hungary and that the quality of the product is good. Among the product characteristics, product quality was the only one to achieve an average score of more than 5.

Conclusions

During the research we formulated three hypotheses. The first hypothesis was that consumers in the research are generally conscious of buying Hungarian products. The answer to this statement is clearly yes, as nearly 82% of the respondents indicated that they consciously buy Hungarian products. These results suggest that the respondents are very attentive to buying products from our country.

The second hypothesis was that consumers in the survey are basically willing to pay more for a proven Hungarian product than for a similar but cheaper foreign product. We also consider the second hypothesis to be confirmed, as 85% of the respondents would be willing to pay more for a Hungarian product if it was proven to come from a Hungarian producer.

The last hypothesis was that a higher proportion of respondents buy products that come directly from producers or from markets. This assumption was only partially confirmed, as we received contradictory data on two questions. The first of these questions asked respondents to indicate the source of their major purchases, for which the percentage distributions of producers and markets were negligible compared to the sources of supply from supermarkets and hypermarkets. However when respondents were asked to indicate the sources where they only purchase certain food products (vegetables, pickles, fruit, bakery, dairy and meat products), respondents indicated a much higher percentage of purchases from markets or from producers/houses. Given the paradoxical nature of the results obtained, we consider this hypothesis to be partially justified, and further research is warranted.

Comparing the different product features we got surprising results. Based on the average value of the answers, the most important was the quality of the products, followed by the origin of the products in Hungary, and the third most important was

the information about the product. Respondents also considered the above-mentioned product features more important than other product features such as price or the importance of promotions and discounts.

Overall, a number of new questions have emerged during the preparation of this research, and further investigation is needed. Further research should be carried out in locations (and platforms) where consumers can be interviewed, even on a larger scale (nationally), about their purchasing habits of local produce.

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The effects of digitalisation on tourism and Catering

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Abstract

As a result of Covid -19 pandemic digitalization and Information Technology started to fast growth, changed our life fundamentally. At the restart of the economy to establish smart tourism became an important factor, having four parts: smart destination, smart experience, smart business system, smart technologies.

Further aim of the the different digital equipments are, to boost the competitiveness industries, by supplying up to date information in this dynamically changing economical environment. In our research we present, how the usage of digitisation technologies how contribute to the area of tourism-hospitality, to decrease of ecological footprint, and climate protection, and sustainability. In our questionnaire focused on the attitudes of the population in accordance of smart tourism.

Keywords:

digitalization, smart and sustainable tourism-hospitality, sustainable welfare

Introduction

The development of the past decades has revolutionized communication and information flow, contributed to the development and globalization of postmodern tourism.

The Digital Economy and Society Index (DESI) has been set up to measure digitalisation, and the figure (1) shows that Hungary is unfortunately in the last third of the EU ranking. We are doing relatively well in the areas of internet access, human capital and internet services, but we are lagging behind in the integration of digital technologies and digital public services.

As our research shows, digitalization turns our life more simple, and according to our view, spreading of the smart idea, sustainable hotel (Bagdadi, 2021) and catering industry (Csapody, 2021) are the areas where it would achieve the greatest impact.



Figure 1. Sustainable tourism
(1) Remenyik et al., 2020

In the field of sustainable tourism and hospitality, smart solutions are best able to continuously ensure the availability of resources for the visitor experience. Visitor feedbacks give tourists information about the authenticity of quality experiences. Digital solutions connect the sector, the local community and tourists, thus striking a balance with the natural environment at the heart of it. It is also easier to avoid social, economic and environmental problems by building smart tourism and hospitality.

Literature review

The presence of digitised solutions in certain areas, such as communication, has been unquestionable for decades. However, in the tourism and hospitality sectors, the balance is still tilting towards traditional solutions, although it is undeniable that there are a large number of efforts to turn this ratio over. All this is not surprising in an industry with a central element of personal interaction between provider and user.

Among the digital solutions related to hotels, it is known that the European market was dominated by 3 OTA's based on 2018 data; these Booking.com (66.4%, upward trend), Expedia (16.6%, upward trend) and HRS (9%, downward trend) (Schegg, 2018). When using BLE technology, a plastic card is no longer needed: the user can open the suitable locks using the Bluetooth connection of their smartphone - be it the hotel room, office or smart home door. (Assa Abloy, 2019).

Artificial Intelligence is the theory and development of computer systems capable of performing tasks that usually require human intelligence, such as visual perception, speech recognition, decision-making and translation between languages (Oxford Dictionary, 2019). The essence of chatbots is that as an online customer service they are able to provide accurate answers to almost all questions, they provide correct and immediate information about prices and services, for which there is no need to employ live power (Németh, 2019).

Internet of Things is the connection of computing devices embedded in everyday objects over the Internet, allowing them to send and receive data (Oxford Dictionary, 2019). Augmented reality (AR) does not require a large amount of devices, as it requires a tablet or smartphone, internet connection and the right application (Nemeth, 2019). At the same time, the concierge robot, which is now used today, has been difficult to understand and answer questions from guests, who have thus turned to human staff instead (Prigg, 2019). In Japan, Fanuc uses robots to prepare and serve four types of pasta dishes within 90 seconds, sold for \$10 per piece each (Williams, 2018), served by autonomous wheeled drones. Food is placed in insulated compartments and consumers are given a safety code to open when the machine arrives at their door sties (Lutrario, 2016).

Despite what has been described above, there are also negative feedbacks, many say that the real waiter cannot be replaced with robots, since if there is a returning guest and he only drinks chilled water, then the waiter will bring him it right away, while the robot is currently unable to do so. The advantage may be that you don't have to pay wages and contributions afterwards, and guests don't have to tip (Sudar, 2018).

Material and methods

After the pandemic, the effects of digitalisation in the tourism economy reached the hotel and hospitality industries first, and our questionnaire on this was completed by 224 people. The questionnaire contained closed questions with predetermined answers or those that could be answered by selecting values ranging from 1 to 7 on the Likert scale.

In addition to rapid processing, the great advantage of applying closed questions is that the results obtained are easier to generalise and are suitable for quick response from the respondent. The Likert scale is essentially a special variant of semantic differential, also called the "agreeing scale" and is very often used in marketing research surveys. For this type of question, the respondent should assess a list of statements relating to a specific topic, in this case digitalisation, in terms of the extent to which he or she agrees with or rejects each claim. We conducted in-depth interviews with the leaders of the MSZÉSZ and Catering Association on how digitalization affects the relaunch of the tourism industry, and what further action would be needed to strengthen the sector.

Results

Smart tourism consist of 4 areas: smart destination, smart experience, smart business system, smart technologies.

In our research we focused on the attitudes connected with functions of the hotel industry. More people use the smart solutions for evaluation of the accommodations as for booking them. More people use smart apps to inseminate their experience of the accommodation service (84% in total). The survey respondents use smart applications for the least different discounts and coupons, but in terms of aggregation, the ordering and use of travel management services has reached a similar rate using smart devices. If we take into account the willingness, we believe that the demand for the implementation of hotel room reservation with a smart application would be high, since a total of 98% of the respondents tried or would be open to try this solution. Probably because it's a faster and easier way to book, than booking via email and communicating with that hotel.

It is interesting, while 55% of those surveyed fully agree to check-in via an app, fewer people and 45% fully support logging out using a smartphone.

In regard to smart technologies, a total of 73% of respondents rated the importance of using smart devices between 5 and 7 points in order to create hotel comfort (e.g. smart TV, app-controlled cooling-heating in the room, smart minibar). A total of 83% prefer or fully agree with the use of applications that can help to explore the possibilities of leisure activities in the given accommodation and its catchment area. These digital solutions all serve the comfort and satisfaction of the guests, so it is also worth opening up to individual accommodation providers in this direction during technological developments. According to the research, the three technological solutions that attract the most interest from travellers are digitized check-in (32%), keyless door opening (23%) and pre-controllable lighting and temperature.

In terms of the use of robots, the majority of respondents appreciated positively the possibility of using robots. 40% of them find this interesting and, by their curiosity, would like to visit a hotel where they can meet a robot employee, 36% are also curious about this technological solution, but by their own admission they are still a little distant to it. Among the surveyed 13% replied that although they did not consider the use of robots interesting, they still accept this fact. Only 6% replied that they completely refuse to do so, with 5% not taking a position on this. Thus, the acceptance of robots was generally characteristic of a total of 89% of respondents. The refusal to use robots is most significant in the area of restaurant, bar and sales, where the rate of replies with no in restaurants was 53% and in sales it was 50%. At the same time, the possible use of robots on the reception and wellness departments received a relatively high proportion of negative answer, 40-45%. All this is connected to the importance of personal relationships, which would be damaged by the substitution of the human factor. Interestingly, the wellness department has the highest proportion of "maybe" responses to the possibility of using robots.

When it came to hospitality, we first wanted to know what characteristics a robotized modern restaurant can have over a traditional restaurant. Mostly precision and multilingualism were highlighted. These are probably these two factors that are found to be the rarest among respondents in today's traditional restaurants. The most beneficial are hygienic and sympathetic characteristics. Those who gave different answer on the whole have a negative opinion, among other answers they wrote that it is impersonal, „ I do not consider it preferable or special at all, but it has no advantage”. After all, the majority of fillers give an average of 2-3 advantages over today's ordinary restaurants.

20% of respondents think that a restaurant where people do not work can offer better quality. You could say the same amount of people are of the opinion that there is no difference between a traditional restaurant and a modern robotized restaurant than those who say that only a traditional restaurant can be better. As a last question, we wanted to focus on the future and ask respondents if they were afraid of machines taking their jobs in the near future, but the respondents clearly answered no to this.

The answers of the respondents are similar in that technological advances would make restaurants cheaper, and it would be exciting to try it out from a one-time visit. They would be wary of a robotized restaurant and would rather be willing to pay less for a service of this quality.

Respondents were most aloof to use digital solutions on two issues: a total of 39% disagreed or disagreed with the use of apps related to restaurant orders, and a total of 61% abstained from using chatbots.

The use of chatbots in tourism and hospitality can be said that only 6% of respondents have used one in their communication. There were 24% of those who only used it occasionally and 32% said that although they had not used such an app before, they were open to trying it. Other respondents do not want to use it (4%) or are not familiar with this communication tool at all (34%). Among AI-based applications, the use of chatbots has almost always emerged as an example and international hotel chains and restaurants have a penchant for communicating with guests. However, based on the questionnaire replies, it can be said that it is not yet well known among Hungarians, since one third of the respondents have not even heard of this.

Conclusions

On the basis of the drawn conclusion of the research we can declare, that the artificial intelligence plays more and more important role in tourism and hospitality **industry**. Ventures strive smartphones into their everyday practice making their work more simple, and provide their customers experience. Some hotel make a try to introduce robots, as undoubtable they are new achievements of the artificial intelligence. The humanoid robots greet the guests inform them about the services,

suggest restaurants, programmes. The fact that guests are greeted by a robot can provoke a divided reaction from people who will receive and please them well, and others will be repulsive. We think that if you don't have to recommend programs, restaurants, baths to the receptionist, it's worth using a robot, because that's what he's doing to answer these questions. The hotel industry is more advanced in the field of smart techniques, for example, the application of the KVIHotel in Budapest is a novel idea, where the guest can check in and out on his smartphone, thus saving a lot of time, so no reception department has been created.

In the housekeeping department, instead of maids, Rosie cleans a cleaning robot, making it easier for housewives to work. In the Food and Beverage department, a robot waiter picks up the order and delivers the finished meals. In the Revenue Management division, programs that are based on big data are used, they get notified when a hotel has raised the room prices, in which case you need to find out the reason, big data can also help you with this. Vienna's Intercontinental hotel already uses a program for room pricing that makes prices dependent on city events. These software can be very useful in the life of a hotel because it can increase their revenue, so it would be worth investing in such programs for as many hotels as possible.

Summary

Digital, smart appliances might have an advantage, that they eliminate the barriers in communication, thus smart apps are accessible in different languages, and thus the foreign guest using the chosen language on the apps can easily, and quickly order different services. Communication problems appears not because of the language barriers in real, they better appears in human-robot communication. The wide spread of these gadgets, applications in everyday life of people, and get accustomed to the use of them, thus the fear is going to decrease, then we do not notice, that we speak-communicate with a robot, and not with a human.

During the in-depth interview we interviewed several well-known hotel and restaurant managers in Budapest, everyone supported the realization of digital developments.

However, the rethinking of the VAT (5% on each area) would be an important change, considerable decrease of taxes on representation (tax exception as high as 2% of the income(Social Contribution Tax (SZOCHO) and Personal Income Tax (SZJA), moreover the introduction of a 30 million upper limit), abolition of the prior notice on the selling the excise goods on occasional events. The most important proposition with no legislative amendments are excise and other controls of hotels-hospitality establishments (in a business-friendly regulatory activity of authorities), extending the opportunities of tenders, elaborate practical direction of legal regulations.

There is decrease in numbers of foreign tourists in 2021, thus it hinders the re-start of the economy, at the same time there is labour shortage in the accommodation services area and hospitality area as well. Uncertainty of the consequence of the compulsory vaccination against fourth wave of pandemic at workplaces.

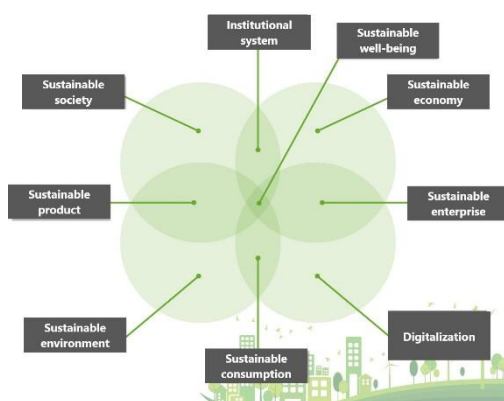


Figure 2. Sustainable welfare
(2) Remenyik et al. 2021

As a summary, it could be told, digitalization contribute to create the sustainable welfare (2) on the area of tourism-hospitality industry.

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Digital disadvantage

Lessons Learnt from Online Education at Agricultural Vocational Schools

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Abstract

The Hungarian vocational education reforms have paved the road to the Vocational Education Strategy 4.0 of 2019 in order to meet the challenges of the fourth industrial revolution. The Covid 19 pandemic hit before the reform measures could take effect and left vocational school teachers and students unprepared to online and hybrid teaching, especially in the case of skilled jobs and professional subjects. This study is an analysis of a research among Hungarian teachers, trainers, management and support staff on the experiences of online teaching at agricultural vocational schools, with a special focus on compensation for digital disadvantages.

Keywords

agricultural vocational education, digital disadvantage, digital competence, online teaching, hybrid education

Introduction

The Hungarian vocational education system has been subject to subsequent reforming attempts since the political transition of 1989-90. Currently we are in the so-called Vocational Education 4.0 era characterised by major systemic reconstruction brought forward by the Ministry of Innovation and Technology, the sustainer of the overwhelming majority of industrial vocational schools, in an attempt to make the vocational education system apt to the challenges of the 4th industrial revolution. The implementation of the reform measures has been severely hindered by the restrictions of 2020-21 due to the Covid 19 Pandemic, while teachers and students had to adapt to very new schooling circumstances from one day to the next when it came to quarantine and online education. The main goal of the current study was to investigate the lessons learned from online teaching and training in agricultural vocational secondary schools through the eyes of teachers and instructors in the midst of a systemic overhauling of the vocational education system.

Literature review

Vocational Education 4.0 was named after the Vocational Training 4.0 Strategy for the development of the vocational training system elaborated in 2019 by the Ministry of Innovation and Technology¹ (ITM-NSZFH, 2019). The primary consulting board that initiates legislative changes is the Vocational Innovation Council headed by the Deputy State Secretary for Vocational Education. Even though the majority of agricultural vocational schools are sustained by the Ministry of Agriculture, legislative reforms are decided upon in the upper mentioned council where the Agricultural Ministry also delegates members. Key objectives of the strategy lie on three pillars: development of inspiring working conditions by establishing modern workshops and a digital curriculum, creation of attractive career prospects, and organisation of extensive training for vocational school teachers and instructors in both student and adult training. The numbering of the strategy refers to the fourth industrial revolution that requires the creation of new jobs while others disappear, and is characterised by new challenges of accelerating growth, new technologies, robotisation and automatization in the field of technology, materials and production processes. It also requires that vocational school graduates enter the job market well prepared and in possession of all necessary competences, including digital skills, that today's turbulent economies need.

The Covid pandemic brought forward a forced transition to online teaching while the education system, in default of the adequate digital tools, teacher competence or even a proven digital education strategy, was not prepared for such challenges. After nearly two years of on-and-off digital education, teachers and students had to make the best out of a hybrid form of teaching. Based on an extensive research (Krismaninata et al, 2020), hybrid learning is defined as a "learning process that combines face-to-face learning and online learning" which has by now grown into a more efficient way of engaging the current generation of students. Following a focus group interview and a series of one-on-one interviews with agricultural vocational teachers in July-September 2021, we would rather refine the definition as follows: Hybrid learning is a learning process when face-to-face teaching and testing is combined with online communication with the application of digital contents, tools, apps and platforms. Before implementing this blended type of learning in vocational education, they argue, things that need to be considered first for the implementation of blended learning are "the normal development of the blended learning model, application of topology, and also knowing the characteristics of the institution". The quick upswing of the pandemic however left no time for such consideration and adaptation had to be immediate. Literature has previously reported (Cox-Prestridge,

¹ Govt. Decree No. 1168/2019. (III. 28.) on the adoption of and measures for the implementation of the "Vocational Education Strategy 4.0" – Midterm Vocational and Adult Education Policy Strategy, an Answer of the Vocational Education System to the Challenges of the Fourth Industrial Revolution <https://net.jogtar.hu/jogszabaly?docid=A19H1168.KOR&txtreferer=00000001.txt>

2021) that student-centred practices are the key to efficient pedagogy in vocational education, especially when it comes to online education.

Vocational training for all professions now includes digital competence development in line with EU norms (CEDEFOP, 2018). It also paves the path to smoother transition to tertiary education and vocational secondary schools are now labelled as the doorway of engineering. Even though vocational students are now less burdened with academic subjects and are deeper involved in sectoral training in the first two years of their secondary education, followed by three more years to baccalaureate and technical degree, transition from one industry to the other during studies has become virtually impossible. While a complete overhauling was starting to take shape, the restrictions and the first quarantine in the spring of 2020 when the first wave of the pandemic hit presented unprecedented challenges to all stakeholders in all fields of education. Teachers still tend to teach how they themselves were taught (Ellis-Hafner, 2003), and until recently, most of their education experience has been in a traditional face-to-face environment (Brinthaup et al, 2011). Agricultural schools have anyway been traditionally lagging behind industrial schools with regards to financial resources, popularity and the level of education they provided. The Agricultural Ministry is therefore lobbying to create a modern, popular secondary vocational system for future farmers and agricultural entrepreneurs. It is therefore of utmost importance to push for adequate resources for modernised school infrastructure and digital competence of both teachers and students.

Material and methods

Following a series of consultation with representatives of the Methodological Directorate of the Centre for Innovative Training Support for Vocational Education, we conducted a primary research in July-September 2021. The research consisted of a focus group interview with 12 teachers and instructors of the Mezőhegyes Vocational School on August 12 2021, a series of one-on-one interviews with vocational teachers and trainers between August-September 2021, as well as an online survey for teachers, instructors, school management and psychological support staff of vocational schools with an agricultural profile between August 25 and 30, 2021.² The statistics of the online questionnaire are as follows:

- The online questionnaire was conducted via Google Forms for distribution through the five agricultural vocational centres to vocational secondary schools. (Vocational centres are administrative hubs with an average of 12 secondary schools per centre);

² Industrial vocational schools belong to Vocational Centres managed by the Ministry of Innovation and Technology, while agricultural vocational schools belong to Agricultural Vocational Centres managed by the Ministry of Agriculture. A distinct minority of secondary schools, either industrial or agricultural, are independent from Vocational Centres and are maintained by churches, civil society organisations or foundations, such as the aforementioned Mezőhegyes Vocational School.

- The questionnaire consisted of 76 questions, out of which 8 questions, roughly 10% required a narrative response, while the rest was multiple choice, checkbox or gradient scale questions;
- Respondents were vocational school employees, among them headmasters and management, academics teachers, teachers of vocational subjects, and assisting staff, including school psychologists, pedagogical assistants, remedial teachers and tutors;
- A total of 954 respondents submitted their replies, of which 38 respondents came from independent schools. The rest of the 912 responses were roughly evenly distributed among the five vocational centres covering the whole territory of Hungary. The total number of responses make up an unexpectedly large sample that makes the research a representative one, and is a clear demonstration how eager are the vocational system staff to make their voices heard.

Results

The focus group interview preceded the online survey in time. The interview was conducted in an honest and friendly atmosphere, and focused on the following areas: whether the teachers are in possession of the necessary digital competences, how they can meet the challenges of online education, what frustrations they had, how they cope with the digital disadvantage of underprivileged students, whether they are open to learn new methods of digital teaching, and finally how open they are to undertake to create digital content and a digital vocational curriculum, and under what circumstances. Our enquires in the online survey covered the following areas: the process of digitalisation in general, digital disadvantage and ways for compensation, digital school infrastructure, digital competence of teachers and students, disposal of ICT tools for students and teachers, and challenges and successes of online teaching.

The introductory questions of the survey inquired about the gender of the respondent, the county their secondary school is located, the vocational centre they belong to, the field of work of the respondent (management, education or vocational training, operations, psychology and support activities, dorm supervision, etc.), and approximately for how long they have worked in secondary education. The questions did not enquire about the specific secondary school the individual respondent worked at in order to ensure full anonymity.

Most of the replies came in from Csongrád-Csanád County, 14.8% of respondents work in this particular county. Respondents otherwise represented fairly evenly all 19 counties plus Budapest, the capital, which means that the research covered the whole territory of Hungary, and it is also true if we take a look at the rather even distribution of responses between all five vocational centres (figure 1.).



Figure 1. Distribution of responses from the five agricultural vocational centres
Source: Own research

Genderwise, roughly half of the respondents were women (50.5%) and men (46.9%), while the rest did not identify as either, hence the percentages do not add up to 100%. Of men, approximately two thirds of them teach vocational subject vs. academic, while the ratio is rather the opposite in the case of women. Of the total 954 respondents, 83 (8.7%) belonged to the management, of whom 35 were women (42.2%) and 47 men (56.6%), which seems a rather balanced ratio. 39.3% of teachers of vocational subjects were women and 58.5% were men, while women are overrepresented as teachers of academic subjects and foreign languages, making up roughly two-thirds, 65.9% of the 361 teachers vs. 31.3% men. As previously assumed, of the 171 supporting staff respondents engaged in psychology, development, pedagogical assistance, tutoring, supporting of students with learning disabilities, etc., the overwhelming majority, 83.6% are women, vs. 13.5% men. As far as specialties are concerned, 40% of respondents were vocational teachers, 34% academic, 13% foreign language teachers, 7% management staff, and the rest were supporting staff, dorm supervisors and IT administrators (figure 2), which means that a fair distribution of secondary school staff felt they would like to contribute to the survey. The distinction of the field of work was important so that, supposedly, different results would be available with regards to attitudes, successes and challenges of online communication with the students.

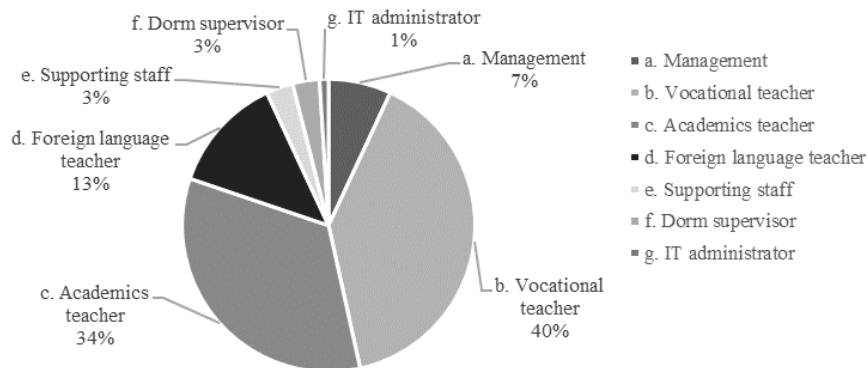


Figure 2. Respondents' field of work
Source: Own research

The last introductory question referred to respondents' period of employment in secondary education, in order to differentiate the way they see trends over time, for example (Figure 3).

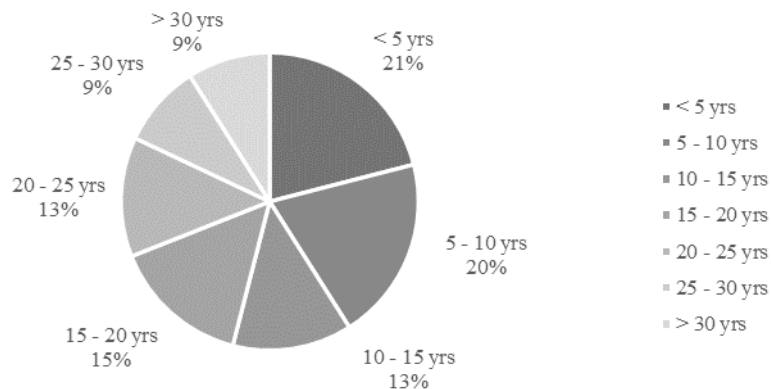


Figure 3. Respondents' period of time they worked in secondary education
Source: Own research

The majority of teachers seem to understand the importance of due preparation for digitalisation. On a scale of 1 to 10, 88% of respondents ranked this importance at 8 or above, and among them, 46%, nearly half of the total sample marked it at 10. There were very similar results to the question how important digital competence is for the primary and secondary education stakeholders, 89% ranked it at 8 or above (Figure 4).

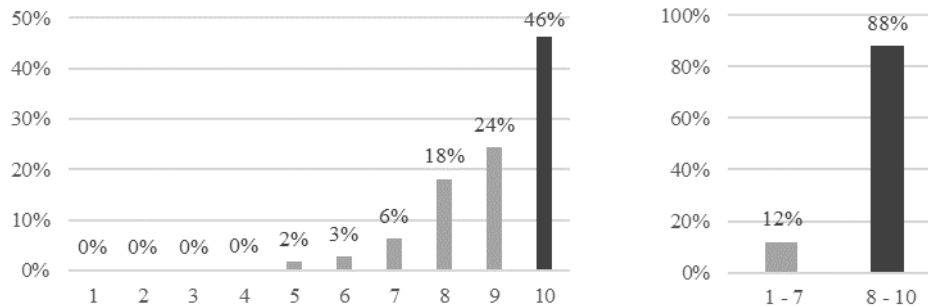


Figure 4. Responses: The importance of preparedness for digitalisation in general on a 1 to 10 gradient scale
Source: Own research

As far as student's general digital competence is concerned, that is how they use their digital devices for their own entertainment such as community sites and live video recordings, respondents on average rate it at 7.8 on a 1 to 10 gradient scale, while when it comes to students' digital competence for educational purposes, that is using certain platforms, communication channels and digital applications, is a 4.2. low. When it comes to teachers' and staff's digital competence, respondents rated the general competence of all teachers at 6.8, while their own competence at 7.5 on a 1 to 10 gradient scale. As expected, younger teachers tended to be more open to acquire new digital skills than their older colleagues, and rate themselves somewhat more digitally competent. Even though teachers consider digital competence important for the adaptation to challenges of the primary labour market (average 7.6 on a 1 to 10 gradient scale), the majority of teachers (68%) judge that vocational skills are impossible or difficult to teach through digital means. The fact that responses showed a large range of opinions demonstrates that teachers have very different experiences and opinions on the challenges and successes of digital teaching. It seemed during the interviews that the more manual and visual skills are required for a vocational training, the less they can be taught online. Teachers are also divided on whether digital education can decrease the disadvantage gap among students (Figure 5), while 43% is convinced that it rather increases the gap and therefore the disadvantage of underprivileged students.

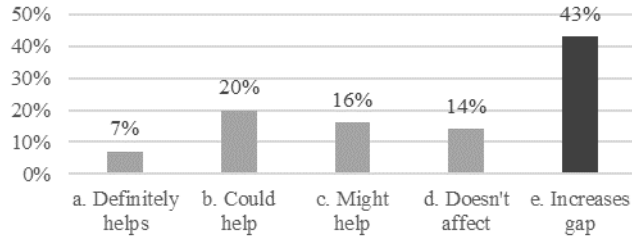


Figure 5. Responses: Can digital education help decrease the disadvantage gap among students?
Source: Own research

Their opinions are even more scattered on the extent to which their subject can be taught digitally (Figure 6) which added up to a poor 4.2, while the proportion of respondents who rated 1-3 meaning that their subject is impossible or nearly impossible to teach digitally adds up to an unexpected high (39%).

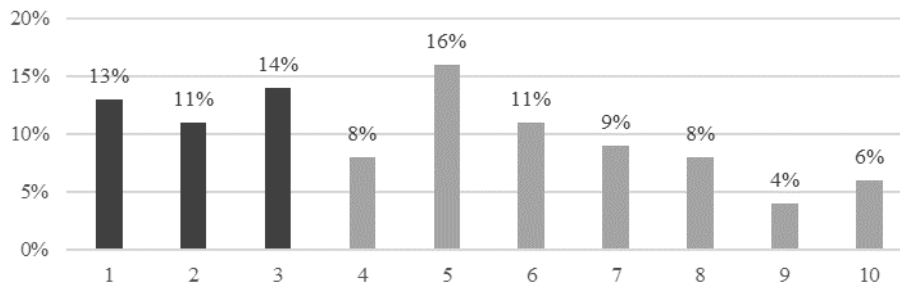


Figure 6. Responses on a 1 – 10 gradient scale: To what extent can your subject be taught digitally?
Source: Own research

Teachers generally expressed their frustration over the lack of core competences of freshmen. More experienced teachers also see a trend in worsening statistics when it comes to reading comprehension and basic mathematical skills of pupils emitted by the primary schools. Some secondary vocational schools perform entrance competence tests on freshmen, however, most of them suggest that the primary school perform an emission test and hold back immature children. The majority of vocational teachers complained that would be the primary schools' job to provide solid competence fundamentals instead of large amounts of factual knowledge. 35% rated that it is absolutely the primary schools job to teach the core competences, along with basic necessary digital skills, while a total of 77% rated it very high (8-10 on a 1-10 gradient scale) (Figure 7).

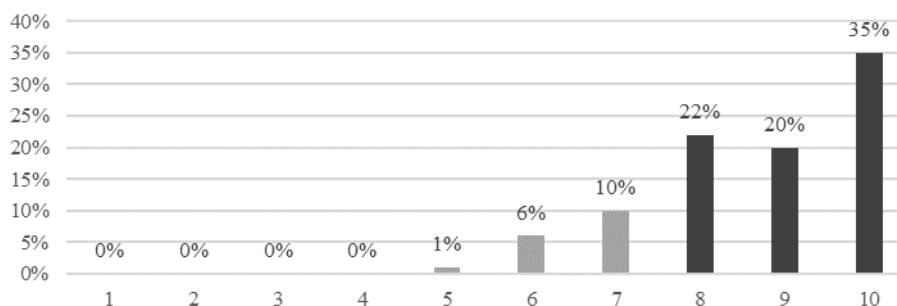


Figure 7. Responses on a 1 – 10 gradient scale: To what extent is it the primary schools' job to provide students with the necessary fundamentals and core competences?

Source: Own research

Teachers also complained about the scarcity of appropriate ICT tools for students. The problem is more severe in disadvantaged districts. It must be very frustrating to perform digital teaching when some of the students are unavailable due to poor or no internet access and/or lack of ICT tools. Most schools could lend some devices including laptops but mainly tablets to the most disadvantaged students, but the number of students with limited access to the only cellular phone of the family was still high. 89% rated 8-10 showing they think it is urgent that students get help with quality devices. Respondents were asked about the causes of their frustrations with digital and online teaching and they mostly emphasized the lack of students' interest and motivation in what they are supposed to study (77%), family problems (69%) and learning difficulties (60%). Absences are a common cause for dropouts while approximately every fourth student struggles with mental, psychic and behavioural problems, according to teachers.

Vocational secondary schools, especially those with agricultural profile traditionally welcome larger proportions of socially and economically disadvantaged, unsocialised and learning impaired students but still, teachers' estimations are shocking about the proportion of students who require prompt attention.

Table 1. Proportion of students with difficulties that hinder their school performance

Proportion of students with difficulties that hinder their school performance	Responses, estimates		
a. 0-5%	2%		
b. 5-10%	11%		
c. 11-25%	19%		
d. 26-50%	33%	More than 25%	68%!
e. 51-75%	26%		
f. 75-100%	9%	More than 50%	35%!

Conclusions

The research and the focus group interview revealed that vocational school teachers are in general concerned about their own incompetence for the digital challenges of the future, even though they have been compelled to acquire a great deal of digital competence since the outbreak of the pandemic, mostly on their own. We learned that the first wave of the pandemic hit the whole education and training system stakeholders unprepared, despite the theoretical 2015 Digital Gap Strategy of the former State Secretariat of Education that has never been tested in practice, and vocational school teachers reported that expectation levels had to be lowered compared to pre-Covid times so that students can cope with the challenges of online education. Students in general tended to enjoy online education at first however with time frustrations grew and motivation lowered.

The majority of teachers understood that having to adapt to online teaching brings forward not only difficulties and frustrations but also new opportunities and inspirations, they emphasise the importance of personal presence both in teaching and especially in pedagogy. It is generally established that even though digital tools were distributed to the most disadvantaged students and small study groups were organised for those whose families that could not afford internet access, disadvantages became deeper and the gap between the well-to-do and poor widened. In general, students lost focus during online teaching much sooner than in personal teaching which demotivated teachers. The majority of teachers now understand that they need to learn new methods to capture and keep the attention of today's youth but no matter how open they are to create more visual, dynamic and interactive content they lack to the support of the vocational centres to teach them new methodologies. Teachers of academic subjects could cope with online teaching while instructors of vocational subjects are mainly frustrated from the impossibility to engage in online teaching. The overwhelming majority of teachers complain that freshmen's core competences are worse every year and blame the primary schools for emitting pupils in large numbers that are incompetent for secondary education. Teachers in general are also frustrated from lack of cooperation from parents some of whom, especially from disadvantaged background, tend to pressure their children into unskilled labour rather than attain their qualification. It is established that the younger generation of teachers tends to be more open to develop their digital knowledge than their older colleagues while they are also more willing to create digital curricular content. The majority of staff requires that digital content creation be fairly and duly remunerated.

Summary

The Ministry of Innovation and Technology, which is in charge of vocational education, as well as the Ministry of Agriculture as sustainer of agricultural vocational sec-

ondary schools are both committed to invest in the reform of the vocational education system in order to create a modern and quality agricultural training that meets the challenges of the digital epoch and emits well-prepared professionals ready to undertake jobs in an agriculture that combines traditions with modern digitalised production methods. The vocational education system has not been so generously donated as currently including the appreciation of teachers both in remuneration and opportunities for free upskilling, renovation of infrastructure, supply of digital devices and budget allocated for curriculum and methodology creation, however, it is generally stated that the grants only compensate for underfinancing of previous administrations. Besides the so far reforms that inspire the stakeholders on the one hand and frustrates them for precariousness on the other, more resources should be allocated for the creation and sustainment of a modern and efficient agricultural vocational education, with more focus on efficient compensation for digital disadvantage.

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The situation of the rural development programme in the first year of the new eu financial period (2021–2027) in BÉKÉS county

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Abstract

The EU agricultural aid cycle between 2021 and 2027 has raised numerous questions and there has been great anticipation in the farming community. We now know: HUF 7537 billion is to be received for the strengthening and developing of the Hungarian countryside from EU and domestic sources of the Common Agricultural Policy (CAP) until 2027. In Hungary, the new common agricultural policy has been accompanied by outstanding national support at European level, both in terms of scale and direction.

On the basis of the already visible and known information it is clear, that in the coming years Békés county will be able to continue to develop persistently. For the 2021-2027 period, the volume of the Rural Development Programme is already visible, as during the last 7-year cycle (2014-2020) a total of 2660 applications were received for nearly HUF 80 billion in Békés county, and currently under just one year 1035 applications were received with a demand of HUF 82,3 billion. The aid that has so far been granted in one year already equals 81% of the total amount of subsidy granted in the last seven years. Subsidies can provide financial assistance to the extraordinary, demanding tasks that are performed every day by those living and working in agriculture around the clock without days off or holidays.

Keywords

Békés county, agricultural aid, common agricultural policy, EU fund, rural development, EU budget, transitional years, 7-year financial period, Rural Development Programme, development, improvement

Introduction

One of the biggest tasks of the next decade of the XXI century is to improve the development of rural areas, the quality of life of their residents, and also to create jobs available locally that young people find attractive, better quality living conditions, infrastructure and services.

Through the EU and domestic resources of the Common Agricultural Policy (CAP) HUF 7537 billion is allocated for the strengthening and developing of the Hungarian countryside until 2027. It is of historical importance for agriculture, food industry and rural settlements that Hungary decided to provide the highest national co-financing from its national budget for EU rural development resources in the European Union. It is important to note that from 2021 80% national co-financing has been provided for EU rural development resources, instead of the rate of 17, 5% of the previous years.

From the HUF 7537 billion available in resources, through the rural development pillar of the Common Agricultural Policy Hungary may use a historic scale of HUF 4265 billion for the development of the Hungarian countryside, Hungarian agriculture and food industry until 2027. Through the first pillar of the CAP, the income support an additional HUF 3272 billion is to help domestic agricultural actors, 100 percent EU from EU sources. Through these resources of unprecedented magnitude, processes that have already started in previous cycles, the renewal of rural villages and infrastructure of small towns, and the construction of a communal and liveable rural Hungary should continue. In view of this, at present the most important tasks so far in the field of agricultural aid are in progress, the performing of request management, on-site inspection and customer service tasks related to the historic-scale subsidies will also be a historic scale for government offices.

Literature Review

For the 2021-2027 programming period the Commission has proposed three draft regulations: CAP Strategic Planning Regulation, Horizontal Regulation, and Complement to Common Organisation of the Markets (CMO) Regulation. In the CAP Strategic Planning Regulation (STR) the Commission presents a proposal for the basic political parameters of the post-2020 CAP, such as the objectives of the CAP, the scope of measures, the basic requirements of the member states as well as financial issues. The legislative proposal contains the framework for measures financed by the European Agricultural Guarantee Fund (EAGF) and the European Agricultural Fund for Rural Development (EAFRD).

Under this regulation Member States would have much greater margin of manoeuvre when developing their own aid strategies, at the same time the promotion of environmentally sound farming that can ensure long-term food security and the strengthening of rural areas should be treated as an important general goal; in addition, as an overarching, so-called horizontal objective, the promotion of innovation and digitisation and modernisation of agricultural holdings.

Larger margin of Member States would allow increased account of local circumstances, but would also mean greater responsibility and accountability. In order to achieve this, the Commission intends that Member States should draw up a so-called CAP Strategy Plan for the use of aid, which includes the resources of the first pillar (e.g. direct aid) and the second pillar (rural development aid). The Strategic Planning Regulation 9 sets out economic, environmental and social, so-called specific EU objectives, based on which member states develop their own state aid policies. The objectives focus on economic viability, support for producers, a higher level of environmental and climate performance and the sustainability of rural areas. In the CAP Strategic Plan, Member states choose –taking into account the local specificities – what measures to take to fulfil the above objectives.

The Hungarian Government, in its Decision of 11. 01. 2021 1003/2021, has made several decisions concerning the future of the CAP, which introduced a certain framework for the transitional years on the one hand, and for the period following the transitional time of the budget cycle.

Materials and Methods

Following an overview of the current information, existing legislation and an assessment of the historical facts of the CAP, results of the ongoing transitional years of the agricultural aid system will be described.

The method of analysis was the analysis and evaluation of data. The data were analysed using general methods of analysis (comparison, percentage comparison). The examined periods are the 2014-2020 long-term EU budget and the transitional first year 2021 before the next long-term EU budget period. In particular, the amount of aid requested in the applications for support submitted under the investment title of the Rural Development Programme and the subsidy amounts set out in the decisions made for these applications (in Grant Agreement documents), as well as the number of applications received during these periods have provided the basis for examination. The work experience and knowledge acquired by the paying agency – and its successor – have been used for the study.

According to the 1003/2021 (01.11.) Government Decree the CAP Strategic Planning must specify that in the 2023-2027 period 25% of the EU rural development resources (European Agricultural Fund for Rural Development) be redeployed to direct aid.

In the 2014-2020 long-term EU budget and in the transitional years of 2021 and 2022, 15% of rural development funds were redeployed, and the size of aid for area payments, greenery and production was determined by taking this into account. From 2023 redeployment will be 25%, but the size of the available EU rural development resources is reduced (the basis for redeployment) and the total amount of direct aid. Consequently, even with increased redeployment, the current level of support –expressed in Euros - is expected to be maintained, or increased slightly. (HUF amount depends on the exchange rate.)

The government decision also concerns the rules for capping (aid withdrawal). It sets the same rules for transitional years 2021 and 2022 as for the 2015-2020 period (1437/2014 government decision). In particular, if the single area payment (basic aid) exceeds EUR 150 000, then the part of the single area payment exceeding EUR 150 000 shall be reduced by 5%; above the amount corresponding to 1200 hectares shall be reduced by 100%. In 2021 and 2022 capping continues to cover only basic aid. It is not yet known what rules on the aid withdrawal will come into force from 2023.

It has also been decided that there is 80% national co-financing for the period of 2021–2027 for EU Rural Development Resources. This means that every 20 Euro

cent is complemented by 80 Euro cents, meaning that four times worth resources are added. (This means fundamental change compared to the co-financing of the 2014-2020 period. The 17,5% co-finance applied then meant that every EUR 1 EU fund was nationally complemented by 17,5 Euro cents. Now, in addition to 1 Euro, 4 Euros will be added.)

Taking into account the size of the domestic Rural Development Programme, with 25% redeployment and rural development amounts available from the Recovery Fund (these are not co-financed), overall nearly HUF 4000 billion are available for rural development purposes. This is approximately three times the amount of aid that was available in the previous 7-year period.

Table 1. County data for Rural Development Proposals (25. 10. 2021.)

	number of applications received	requested aid (billion HUF)	number of applications closed by Grant Agreement (TO) document	TO grant (billion HUF)
2014-2020	2660	80	1516	29
2020-2021	1035	82,3	306	23,4

In Békés county so far 1035 rural development applications have been received for HUF 82,32 billion requested aid (data of 25.10.2021) in the framework of the Rural Development Programme launched last autumn, and grant agreement documents are continuously being received by the applicants (e.g.: for the development of livestock breeding facilities, farming, water management, development of small-scale agriculture). In many cases, administration is in progress, as there are several submission phases in a title, and new titles regularly appear. 306 Grant Agreements have been drawn up with HUF 23,4 billion worth aid.

It is a particularly important fact that in the CAP period of 2014-2020 a total of 2660 applications were received for nearly HUF 80 billion requested aid in the county. 1516 of these applications were granted and the total of HUF 29 billion was held in total (the reason for the significant difference between the requested and granted support is that many items had a top limit and due to the exhaustion of funds many good applications did not receive grant agreement). A total of 1505 payment claims have been submitted, of which 1268 have been paid in the amount of HUF 15 billion. 649 projects have been completely accounted for. Thus, 867 projects are still in progress and HUF 14 billion is still to be paid, of which 237 are currently undergoing administration, but have not yet been paid. According to these results, the remaining HUF 14 billion may be paid by submitting 1186 payment claims.

Within the Rural Development Programme, the non-investment aid must also be highlighted in addition to the above mentioned investment subsidies. The call for

proposals of the AKG and ÖKO have recently been published, with AKG providing HUF 360 billion support source, organic production being supported by HUF 40 billion over the next three years.

In addition to the Rural Development Programme, annual, regular other agricultural aid is also worth mentioning, as it is also significant in the county. In 2020 the agricultural subsidies payments in Békés county totalled HUF 59,5 billion. The total amount of direct payments available to farmers in single application was close to HUF 41,6 billion. The majority of direct payments are made up of two grants: area-based subsidies that were worth HUF 21,2 billion for 12.724 customers, and 'greening' aid for 12.665 customers paid in a total of HUF 14,1 billion. A wide range of direct aid linked to production totalled HUF 4,2 billion for farmers, of which plant-based production aid was nearly HUF 1,4 billion, animal headage-based production payments came to HUF 2,8 billion.

Results and Conclusions

The new cycle CAP agreement basically defines the future of the Hungarian agriculture aid system and production conditions for the period of 2021-2027, more specifically the period between 2023-2027, considering the two years of transition.

For the 2021-2027 period, the volume of the Rural Development Programme is already visible, as during the last 7-year cycle (2014-2020) a total of 2660 applications were received for nearly HUF 80 billion in Békés county, and currently under just one year 1035 applications were received with a demand of HUF 82,3 billion. The aid that has so far been granted in one year already equals 81% of the total amount of subsidy granted in the last seven years. It is also a great advantage that the tendering option in the transitional years, the conditionality of the aid clause, is transformed according to the usual rules of the previous cycle, thus while the preparation of the Member States is taking place for the expectations and requirements of the new cycle, the rights and obligations of farmers will continue within the framework of the already acquainted system, guaranteeing the successful aid granting of this period.

On the basis of the already visible and known information it is clear, that in the coming years Békés county will be able to continue to develop persistently. The population of the county in 1941 was 466 thousand, while currently the population is around 335 thousand. This process needs to be stopped. It is true that without agriculture there is no successful rural development, but if the countryside does not improve young people will not choose rural life, and in twenty years' time there will be no one to farm the good quality land of Békés county, also known as the country's pantry. In rural areas only agriculture can sustainably provide jobs that ensure decent civil standards.

Summary

In 2021 in the field of agricultural aid a transitional year has begun, which will surely last for yet another year. Subsequently, a new grant period will begin from 2023 until 2027. During the transitional years, producers may have access to the financial resources essential for their operation and prosperity in an unaltered form and extent.

Subsidies can provide financial assistance to the extraordinary, demanding tasks that are performed every day by those living and working in agriculture around the clock without days off or holidays. At the same time, it is also great help for the customers as without agricultural aid, food would have to be purchased at a much higher price. In addition, agricultural aid also has a great impact on the quality of produce and products.

In Hungary, the new Common Agricultural Policy is accompanied by outstanding national support at European level both in scale and in direction. It is unprecedented, as it is difficult to find a country in the 60-year old history of common agriculture policy that would triple the amounts allocated for rural development. This will implement the real mission of the rural development programme, creating new funds for sectoral development, giving new hope and vision to the countryside and the future generations. It is a message that gives vision for people living in agriculture that the valuable job and efforts that are performed in the „care of the countryside” has come to a new era. In the new budget period, the amounts to make rural areas viable and develop will also exceed the amounts to be allocated to direct aid.

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Spatial analysis of the training success of those in public employment in Hungary

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Abstract

The study presents the training and upgrading of those who have left the primary labour market, the publicly employed and the unemployed in Hungary. Public employment is a transitional measure designed to help people who have been excluded from the world of work back into it. Training courses for the publicly employed are designed with the same aim, to get trainees into work as quickly as possible by teaching them a new trade. The country did not distribute the participants equally, but concentrated training where it was most needed. The training did not have the desired effect, as a higher proportion of those who successfully completed the training were able to re-enter the secondary labour market or became unemployed.

Keywords

adult training, public employee, employment success rate

Introduction

The changes in education in the context of globalisation are a major challenge. More and more people entered the public education system, which later led to a massive expansion of higher education and adult education (Kozma, 2006). Public education, vocational education and training, higher education and adult education are grouped together under the system of education and training institutions. The education and training institutional systems overlap and, despite their independent character, they can be most effective in their educational tasks if they cooperate with each other (Csoma, 2005). Of the sectors of the education system, the fourth, adult education, is the most strongly developing, as social and demographic challenges have resulted in a gradual shift in the focus of education policy towards out-of-school education (Kozma, 2006).

Educational attainment has a major impact on an individual's future labour market position. Training as education is one of the main tools for creating social welfare and a knowledge-based society (Kovácsné Percz, Koncz, 2016). As a consequence, it is included in the Lisbon Strategy and has been included in the Europe 2020 Strategy objectives (Caragea, 2011). In our country, not only has the lack of resources caused adult learning to be marginalised, but also the lack of incentives to increase wages and job opportunities (Csoba, 2010a). Adult learning is not able to adapt adequately to actual training needs. The most needy are not being adequately integrated into

the training system and the supply of training is not adapting to demand (Pulay, 2009).

In Hungary, adult learning is predominantly not taken up by those who most need it, for example to raise their level of qualification or to fill skills gaps. Low educational attainment creates disadvantage not only because of a lack of basic skills, but also because of attitudes that are essential for acquiring further skills, which are reflected in the communication skills needed for development (Nagyné Demeter, Koncz, 2016). Nowadays, it is no longer enough to have the right qualifications or experience to get a job. Today, the demand is almost exclusively for a workforce that is adaptable, capable of being retrained, upgraded and renewed (Rothes et al., 2017).

The Hungarian government has sought to address the problems of unemployment and poverty by expanding public employment, and in this concept public employment has social, employment and policy functions (Váradi 2015). Public employment has an important role to play in preventing the emergence of livelihood crime by compensating for the loss of income of those who leave the labour market and reducing welfare expenditure (Csoba, 2010b).

According to G. Fekete, public employment can be beneficial for both the individual and the community. On the one hand, if well organised, it can beautify, build, make the community healthier and more liveable, and keep morale stable. On the other hand, employees benefit from the fact that they receive higher wages than the benefits they receive for the work they do, they set an example for their children, they feel useful members of society and their self-esteem increases (G. Fekete, Lip-ták 2014).

Public employment also helps to reduce the long-term economic and social impact of high rates of long-term unemployment. It helps to counteract the decline in the value of work, the emergence of a moral crisis, social exclusion, increased poverty, the stabilisation of unequal income relations, the emergence of material dependency or material vulnerability, as well as the gradual decline in purchasing power and the contraction of the internal market (Pirisi, 2018).

Material and methods

In the study I have used data from the GINOP-6.1.1-15-2015-00001 priority project "Training of low-skilled and public employees", from which Budapest and Pest county were excluded, so I have marked the data of these two areas with 0 for the illustration on the maps.

As a basis for the secondary research, I reviewed available national and international textbooks and journal articles on the subject. After consulting them, I processed the data provided by the Ministry of Innovation and Technology for Hungary and its municipalities. The research covers the period 2016-2020. I reviewed the statistical data of participants in training courses for public employees launched by the Government Offices. A comparison was made based on the participant data. I

compared the placement of the trained in the primary and secondary labour market during the period under study. I processed and evaluated the collected data using Microsoft Office 2013. I used ArcGIS 10.6.1 GIS software for spatial analysis of the calculated statistics and mapping of the obtained results.

Results

In the training courses for public employees, the proportion of female graduates was higher in all the years studied. The smallest difference between the proportions by gender was in 2017, when there was only a 10.3% difference. In a previous study, I found that women are in the majority among those enrolled in training because a large proportion of men have a job in the informal sector and a higher proportion of men are in seasonal jobs. The number of people enrolled in training showed a linear increase until 2018, after which it started a drastic downward trend. The maximum number of those enrolled in training was reached in 2018, with 31.8% of the total number of public employees enrolled in 5 years being enrolled in that year. In the last year of the period under review, the emergence of the coronavirus had a major impact on the ability to start training, there were periods when it was not possible to organise and start training in the country, and training courses that had already started were also interrupted (Figure 1).

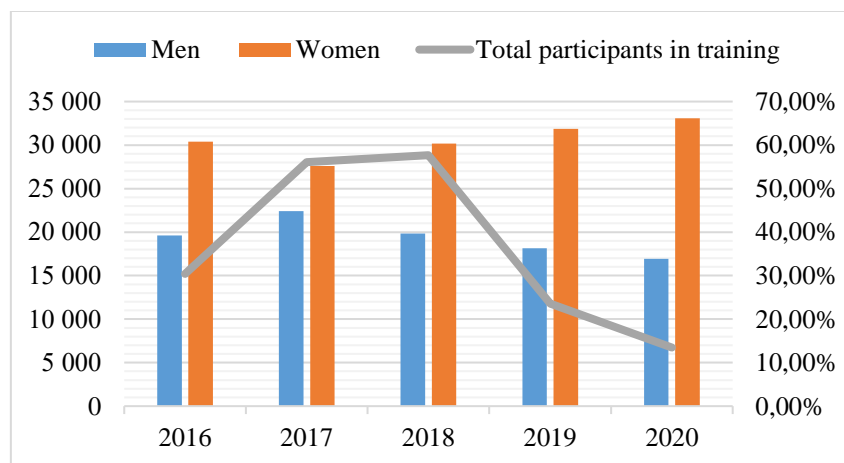


Figure 1: Data on the number of participants in training courses for public employees and their gender ratio (2016–2020)

Source: own production based on data from the Ministry of Innovation and Technology

There is an even distribution of proportions within the age group across regions. Naturally, the cohort with the largest number and proportion of people was the 25-54 age group. In terms of proportions of those qualified within the region, the South

Transdanubian region had the highest number of participants in the under-25 age group and the West Transdanubian region the lowest, but the two regions show the opposite in terms of the age group close to retirement age. The West-Transdanubian region had the highest proportion of public employees enrolled in the last 5 years, while the South-Transdanubian region had the lowest. In terms of national proportions, the proportion of qualified people in the under-25 age group was 16.5%, the proportion of people in the 25-54 cohort was 70.1%, while the proportion of people in the over-54 cohort was 12.5%. Only the Southern Great Plain region had a value below the national average for the 25-54 age group, with the Northern Hungary and Southern Transdanubia regions having a lower value than the national average for the 54+ age group (Figure 2).

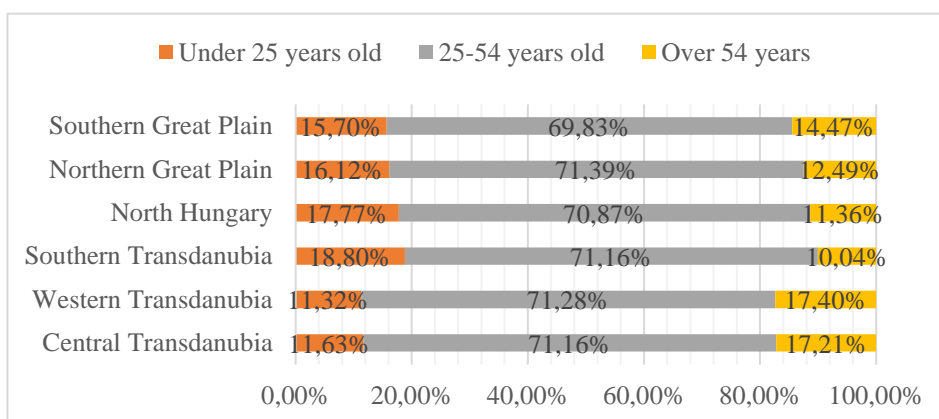


Figure 2: Age distribution of participants in training for public employees (2016-2020)
Source: own production based on data from the Ministry of Innovation and Technology

People in public employment tend to have low levels of education. The Ministry of Innovation and Technology considers primary education to be all education below vocational school level, secondary education from vocational school to technical school and tertiary education to be college, university and higher vocational education. The distribution of educational attainment shows that most participants have primary school or less. The national average for those with primary education was 86.7% over the period, exceeded only by the regions of North Great Plain and South Transdanubia. The national average for those with upper secondary education was 12.9%, well exceeded by the Central and Western Transdanubian regions, and exceeded by the North-Hungarian region. The group with the lowest participation was those with tertiary education, with a national average of 0.23%. Those with the highest educational attainment were more significantly represented in two regions, namely the West Transdanubian and Central Transdanubian regions (Figure 3).

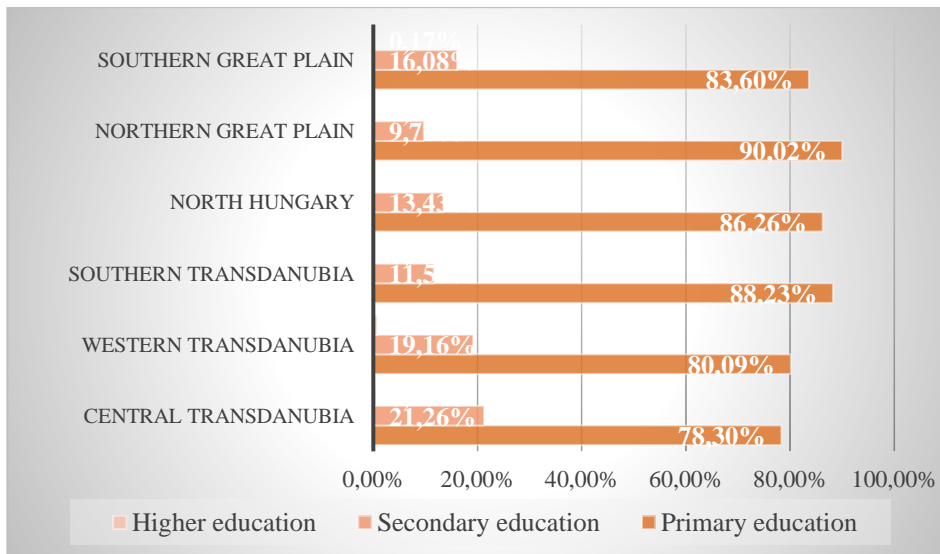


Figure 3: Distribution of participants in training courses for public employees by highest level of education (2016–2020)

Source: own production based on data from the Ministry of Innovation and Technology

The numbers of people involved in training vary between counties in the country. Most of the people involved in training were in counties with essentially high unemployment, low employment rates and high public employment. The eastern part of the country had the highest number of trainees over the past 5 years as a whole. Szabolcs-Szatmár-Bereg county had the highest number of public employees in training, followed by Borsod-Abaúj-Zemplén county and Hajdú-Bihar county. These three counties have trained 45.16% of the public employees trained in the last 5 years. The average number of people recruited in our county in the country was 4956, with only 5 counties above this figure, the 3 counties just mentioned and the counties of Baranya and Somogy. Vas County had the lowest number of public employees in total 779, not far above Győr-Moson-Sopron County with 785 (Figure 4).

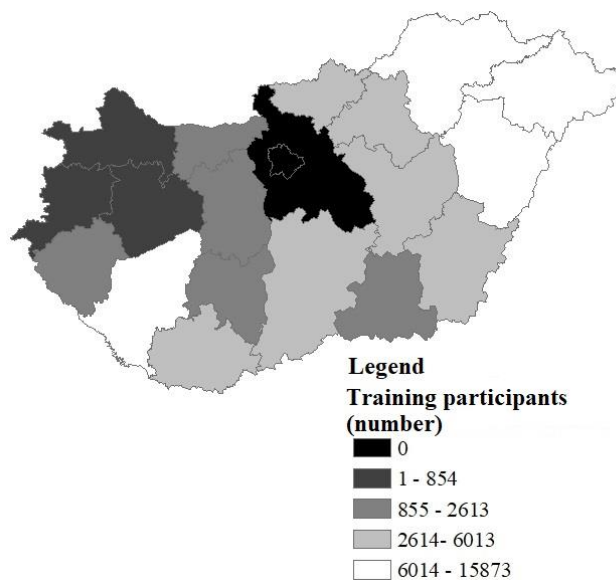


Figure 3: County distribution of participants in training for public employees (2016–2020)
Source: own production based on data from the Ministry of Innovation and Technology

The success of the training is measured by the job placement rate. In our country, there are two labour market sectors, the primary labour market and public employment, the secondary labour market. As for all training, the most important thing is to find a job in the primary labour market. Figure 5 illustrates clearly that the majority of those trained were able to find employment in the secondary labour market in each region. In the years studied, 2019 had the lowest share of people in public employment. The region of Central Transdanubia had the highest rate of placement in the primary labour market, with over 25% in 2019, while the region of Northern Great Plain had the lowest rate on average. The region with the highest share of people in the secondary labour market after completing their training was the Southern Great Plain region in 2016, where it almost reached 50%. Overall, those with qualifications are most likely to find employment in public employment.

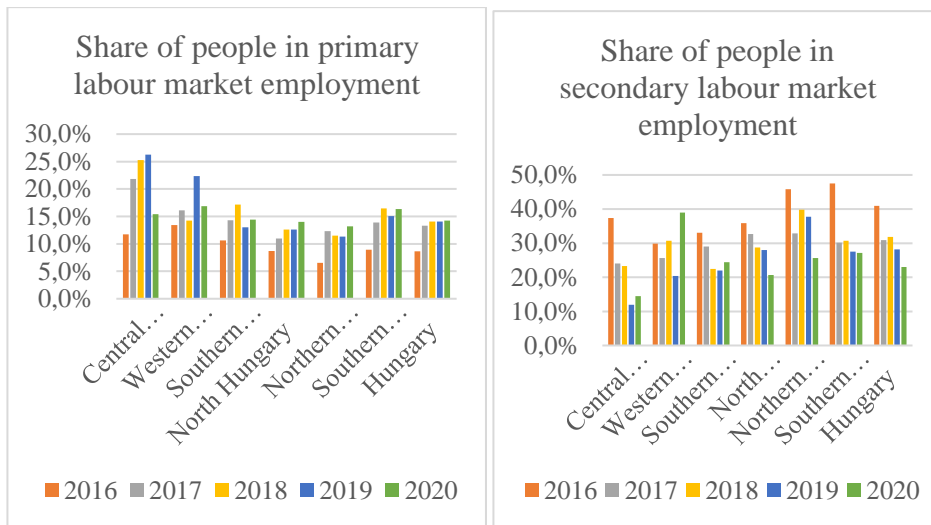


Figure 5: Distribution of participants in training courses for the public employed in the primary and secondary labour market (2016-2020)

Source: own production based on data from the Ministry of Innovation and Technology

Conclusions

In the period under review, the number of apprentices in training for those in public employment fell dramatically. In all the years under review, a higher proportion of women were enrolled in training. Most of the trainees had low levels of education, which can be positively affected by training, as it allows trainees to learn new skills. Eastern Hungary had the highest number of trainees, with 45% of all trainees enrolled. Of course, this is due to negative economic trends, as these areas are characterised by high unemployment rates, low employment rates and relatively high levels of public employment.

Differences between the East and West regions were also evident for those with the highest educational attainment. The East was dominated by a higher share of primary education, while the West also had a higher share of secondary and tertiary education.

Public employment, and thus also training, is designed to help participants integrate into the primary labour market. Regrettably, those who are in public employment are able to re-enter public employment after completing their training.

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The impact of the coronavirus on adult training for job seekers in Békés county

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Abstract

The aim of adult training for jobseekers is to help participants find a new job in the primary labour market as soon as possible, with new marketable skills. The training courses provided by the County Government Offices were not affected by the digital training ordered by the Government, as the training courses under Article 14(1) and Article 14/A of Act IV of 1991 on the Promotion of Employment and Unemployment Benefits (hereinafter referred to as the "Act") were suspended under Government Decree 70/2020 (26.III.), and it was not possible to continue these courses. The subsidised training courses started under Act IV of 1991 on the Promotion of Employment and Unemployment Benefits and in progress on the date of entry into force of the Decree were suspended by operation of law for the duration of the emergency and no further training courses could be started during the emergency. The training courses supported by the Government Office do not include digital and distance learning, but traditional face-to-face courses are provided by the training institutions contracted by the Government Office, and as a result the pandemic period has caused significant financial damage to the support sector. The amount paid out in the first pandemic period of the coronavirus would have enabled 360 people in the county to find new marketable skills.

Keywords

adult training, jobseeker, coronavirus, pandemic

Introduction

In Hungary, as in all sectors of the economy, education has been affected by the coronavirus. In terms of the economic sector of education, the adult education sector was the most affected financially.

High unemployment was not a major problem nationally in the years preceding the epidemic, but this is no longer the case on a regional scale. Indeed, disadvantaged regions and municipalities have had unemployment rates several times higher than the national average (Lipták, 2019). The democratisation of the Hungarian socio-political system and the transformation of the economic structure in recent decades have generated sweeping changes in the labour market, encouraging potential employees to learn and to participate in education. As a result, the role of learning has become a key driver of the economy and has been enhanced (Rakaczkiné, 2010).

The economic downturn associated with the coronavirus epidemic is expected to hit Hungary's disadvantaged areas harder. In these areas, families have the lowest

financial reserves, less favourable employment opportunities and lower than average educational attainment. In the long term, the epidemic could lead to the return of people who have moved abroad for work. According to Austrian statistics, 13.4% of Hungarian workers lost their jobs in the first month of the epidemic, leaving them in a particularly vulnerable position in the labour market. It is likely that this problem is not only specific to those working in Austria, but may also characterise other more populous groups working abroad, and may result in workers returning home (Koós, 2020).

UNESCO and the European Union first used the terms adult education or adult learning policy in policy documents to refer to lifelong learning, but these terms have been replaced by the term adult learning, which covers all informal, formal and non-formal learning activities, whether vocational or general, undertaken by adults to complement their studies (Council, 2011).

According to the preamble of the Act on Adult Education [1] (Fktv.), the aim of the Act is to enable people living in Hungary to meet the challenges of economic, technological and cultural development (Cseszka, 2017). They should be able to engage effectively in the world of work, be successful in life and improve their life skills through adult education (Koncz, 2017). There is a need to increase the organisation of vocational, linguistic and supported training.

Material and methods

Before conducting the research based on the data provided by the Labour Market Department of the Employment and Labour Protection Department of the Békés County Government Office, I reviewed the available national and international textbooks and journal articles on the topic. After having consulted them, I consulted and downloaded the databases of the National Employment Service and the databases available on the OSAP 1665 Statistical Interface for the districts and municipalities of Békés County. The research covers the first pandemic period caused by the coronavirus. I looked at the number of students in the training systems. The collected databases were processed and evaluated using Microsoft Office 2013.

Results

Many workers in Békés County have also lost their jobs as a result of the coronavirus. The first pandemic period in Hungary lasted from March to June 2020. In the period under review, the number of jobseekers increased by more than 4,000 compared to the same months of the previous year. While a year earlier (2019) there had been a steady downward trend in the number of unemployed people in the county, in 2020 there was a linear increase in the number of unemployed people due to the economic impact of the pandemic. The number of job seekers in the county in the first month of the pandemic period caused by the coronavirus still showed an

increase of 0.3% compared to 2019 (Figure 1). In the months that followed, the favorable March statistics changed completely. In April, the number of unemployed increased by 31.38% year-on-year, in May by 46.31% and in June by 49.16%. The average number of jobseekers in the four months was 11,689 in 2019, while in 2020 it was 15,416 due to layoffs caused by the crown virus, an increase of 31.8%.

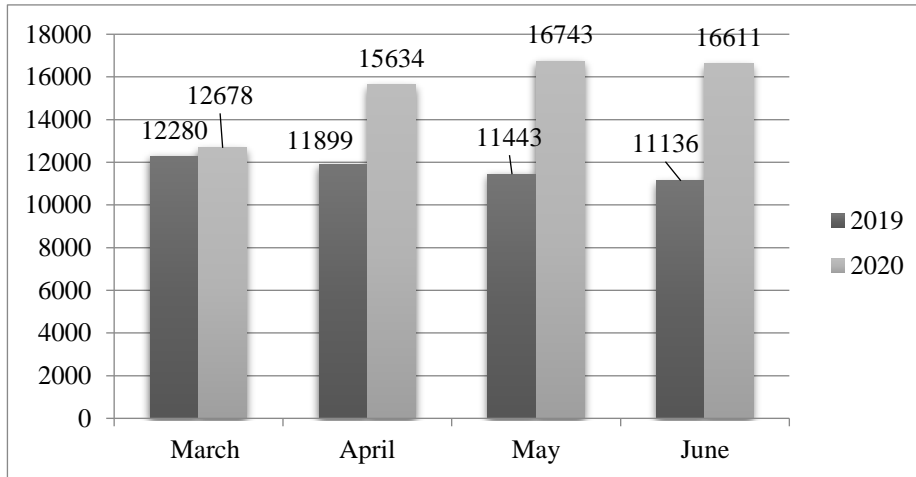


Figure 1: Trends in the number of unemployed in Békés County during the first wave of the coronavirus and one year earlier (persons)

Source: based on own work (www.nfsz.munka.hu)

In terms of the total number of vacancies on the register, there was a more significant decrease in 2019 than in 2020, with a 68.46% drop in the number of vacancies in the period from March to June 2019, and a 56.06% drop in the same period in 2020. In this respect, the impact of the crown virus was therefore not significant compared to the previous year. In the pandemic period, the number of job vacancies decreased similarly to the previous year (Figure 2). The impact of the pandemic was similar for both employers and employees.

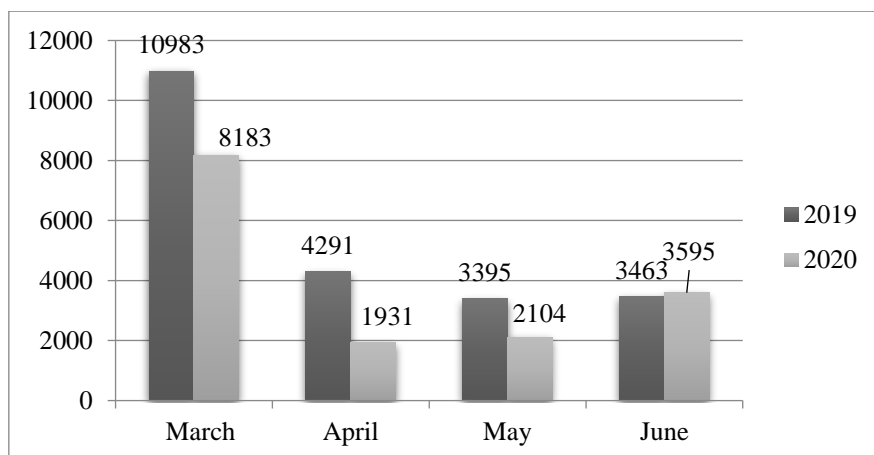


Figure 2: Number of vacancies in Békés county during the first wave of the coronavirus and one year earlier
Source: based on own work (www.nfsz.munka.hu)

Pursuant to Government Decree 70/2020 (III. 26.) on the different rules for ensuring education and professional examinations in adult education (hereinafter: Government Decree), the training courses supported by the Government Office have been suspended with effect from 27 March 2020, in order to prevent a human epidemic causing mass disease that threatens the safety of life and property, and to avert the consequences of such an emergency situation in order to protect the health and lives of Hungarian citizens. In Békés County, 46 courses were suspended, of which 26 were listed in the National Training Register.

A total of 646 participants took part in the 46 training courses, of which 471 were participants in OKJ training courses, such as refrigeration and air conditioning systems technician, car mechanic, waiter and social care and nursing. It can be observed in the training courses launched by the Government Office of Békés County that there is a much stronger preference for vocational training, as 56% of the number of training courses and 72.9% of the number of participants in training courses were linked to vocational training courses listed in the National Training Register. Based on the above data, and in my opinion, from a labour market perspective, learning a new occupation helps a higher rate of return to employment than attending a training course or general adult education.

The digital training ordered by the Government did not affect the training courses run by the Békés County Government Office, since the training courses under Article 14(1) and Article 14/A of Act IV of 1991 on the Promotion of Employment and Unemployment Benefits (hereinafter 'the Act') were suspended on the basis of the Government Decree and it was not possible to continue these courses. The training

courses supported by the Government Office do not offer digital training, but traditional face-to-face courses are provided by the training institutions contracted by the Government Office.

Most of the adult education institutions have a well-equipped IT background and most of them could have undertaken the non-exercise oriented training during the pandemic period, thus saving significant additional costs for both the Government Office of Békés County and the State.

The public employment wage for public employees is HUF 81,530/month pursuant to Article 1 (1) paragraph 1 of Government Decree No. 170/2011 (VIII.24.), and the guaranteed public employment wage is HUF 106,555/month pursuant to Article 2 (1) paragraph 2 of Government Decree No. 170/2011 (VIII.24.). Employment substitution allowance (FHT) 1993. évi III. tv. (Social Security Act), the monthly amount of the employment substitution allowance is 80% of the current minimum amount of the old-age pension: (HUF 22,800/month in 2020). Participants in training courses for jobseekers supported by the European Union, the Hungarian State and other sources are entitled to a supplementary allowance, which is regulated by Article 14(6) of Act IV of 1991. At the discretionary rate of between 60% and 100% of the minimum wage in force, the amount of the earnings replacement allowance may range from HUF 96,600 per month to HUF 161,000 per month, in Békés County this amount for participants in training is HUF 112,700 per month, which is 70% of the minimum wage in force. In other words, it is more profitable to participate in training for job seekers than to work in public employment.

According to the decision of the Békés County Government Office, during the pandemic period, the income replacement allowance for participants in training courses was 60% of the applicable minimum wage, i.e. 96,600 HUF/month. The training courses were suspended with effect from 27 March 2020 and, with the amendment of Government Decree 282/2020, the courses could be restarted with personal attendance from 18 June 2020.

The participants in the training courses received significantly more financial support during the pandemic period thanks to the supplementary allowance, as each participant received an allowance of HUF 96,600/month during the three months without training, i.e. an additional income of almost HUF 300,000 per person.

Conclusions

The European Union, the state and the Government Office of Békés County paid 62.403.600 HUF per month for the shutdown caused by the crown virus. Considering the whole pandemic period, this amount was close to HUF 250 million.

If the Government Office of Békés County could have used the above amount for other training, it could have launched 24 training courses with an average of 15 participants per group of 6 months of vocational training listed in the National Training Register, i.e. it could have provided new professions for more than 360 people with

this amount if the digital form of education could have been introduced in the training courses financed by the Government Offices.

The crown virus has had a negative impact not only on the economy, and thus on unemployment, but also on the adult training courses for jobseekers funded by the Békés County Government Office. The number of jobseekers in the county increased by an average of 4,000 in the period under review compared to the same months of the previous year.

The number of vacancies fell by 7,000 in the year before the coronavirus epidemic period, with 7,600 fewer vacancies in the county between March and June 2019 and 4,600 fewer in 2020.

As a result of training being halted in the county, trainees continued to receive an earnings replacement allowance after the training was halted, with a corresponding increase in expenditure by training funders. If the training had continued digitally, 360 people would have been able to enter a new occupation on the basis of the additional costs.

In my opinion, the introduction of digital education in this form of training could be a solution for the future, as the knowledge of all the theoretical parts, with the exception of the practical training, can be transferred to the students in digital form. Nowadays, almost all adult education institutions are well equipped with IT facilities and could fully meet the training needs in digital form.

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Differences in unemployment and adult education in borsod- abaúj-zemplén county and Győr-Moson-Sopron County

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Abstract

We can talk about a competitive knowledge-based society if the concept of lifelong learning is achieved. Adult education has a major role to play in this, as it aims not only to renew renewable, up-to-date knowledge, but also to reintegrate jobseekers who have been excluded from the labor market. Borsod-Abaúj-Zemplén county and Győr-Moson-Sopron county are completely opposite to each other in all economic indicators. Much of the training supported by the European Union focuses on rural areas with high unemployment. In Borsod-Abaúj-Zemplén county, the number of participants in adult education exceeds the national average because the European Union-supported adult education for jobseekers received a great deal of emphasis, but in Győr-Moson-Sopron county the trainings financed by the participant were more present.

Keywords

human resources, adult education, unemployment, East-West Slope

Introduction

The economic growth and competitiveness of regions are affected by the availability of education, learning, knowledge and training (Lengyel, 2012). Nowadays, the knowledge economy has become a priority objective, investment in human capital has been valorised and lifelong learning has become a priority (Kálmán, 2012). Adult learning can replace the barriers to school-based training in a short time, as it can correct labour market problems in a shorter time by providing further training and retraining (Mayer, 2000).

Among the group of people with low educational attainment, there are already an increasing number of people who are completely excluded from the labour market because they do not have even minimal competences (Köllő, 2009). Today, it is no longer enough to have a qualification to do a job; it is now important to have a workforce that is adaptable, capable of upgrading and retraining at any time (Ábrahám, 2015).

Participation in adult learning can be a constraint or an opportunity that can change the labour market situation and the life of the participant. Of course, participants have different perceptions of the opportunity-creating role of adult learning. Most

of the time, people in the counties or social groups that would be most in need do not participate in training, which is probably the reason why in our country the share of adult education students in disadvantaged counties is very low, which can lead to huge disadvantages later on (Köllő, 2009).

The most frequently heard accusation about vocational education and training is that training is not provided in occupations that match labour market demand, resulting in a shortage of some skills in certain regions, while there is an oversupply of some skills and the labour market is unable to absorb graduates. Hungary's labour market is highly segmented, both territorially and structurally. A significant proportion of the unemployed are victims of frictional unemployment, i.e. they are looking for and supplying the same thing on the demand and supply sides, but their interests do not coincide. There are many reasons for this, such as mobility or wage problems (Óry, 2005).

In adult learning, there is a need to create harmony between the three axes of interest, matching demand from the employer's point of view, the needs of learners and the supply of schools. Short-term flexibility is most favoured by labour market demand, in contrast to the medium-term rigidity of the supply of training institutions and the demand of those wishing to learn. Multinational companies are attracting skilled workers with strong career prospects, with opportunities for promotion, high incomes and attractive working conditions. This is not the reality, of course, as large companies look at skilled workers as any resource, seeking to maximise profits. For the company, the most important thing is that workers carry out the instructions required for a given task accurately. They only look for workers for positions that they cannot automate with today's technology. This shows that it is not only large companies that need to train adult education institutions. It can be said that when profits fall, the first thing large companies do is to lay off skilled and semi-skilled workers, because profit comes first for the company. Generally speaking, everyone talks about the difficulty of finding a job and over-qualification in the so-called 'fashionable' professions, whereas interest in them is undiminished (Szép, 2008).

The impact of the regime change has been the disappearance of socialist enterprises and, at the same time, of apprenticeships. As a result, it is no longer possible to provide the high quality education to those enrolled in vocational schools that was possible 25-30 years ago, as the workshops had everything they needed to provide quality education. Today, this is almost impossible if a school is not specialised in a few trades and does not have an equipped workshop. There is a gap between the qualities of the pupils, the vocational and examination requirements and the competences expected by companies. Between 60 and 70 percent of students in vocational schools are functionally illiterate and over 90 percent cannot master the requirements. Apprenticeship training is required by law for certain trades, but tax laws are

holding back businesses, resulting in a surge in apprenticeship contracts (Szép, 2010).

The majority of adult vocational education and training takes place outside the school system, but legislation allows for the possibility to start in the school system (Váradi, 2004). The largest share of training outside the school system is labour market training, which includes both vocational and complementary training, which applies to the unemployed and the employed alike (Kraiciné-Tibori, 2007). Educational institutions, employment centres and employers are mainly involved in the organisation and creation of non-formal training.

The importance of out-of-school vocational training for maintaining and improving employability is highly significant, and it is therefore important that the functioning of the vocational training system is effective in alleviating structural unemployment (Card, 2011).

Material and methods

As a basis for the secondary research, I reviewed available national and international textbooks and journal articles on the topic. After consulting them, I consulted and downloaded the website of the National Employment Service and the databases available on the OSAP 1665 Statistics Interface. The analysis was carried out for the unemployment and adult education situation in the county of Borsod-Abaúj-Zemplén, Győr-Moson-Sopron county.

The training courses for jobseekers supported by the European Union aim at their successful assimilation into the labour market with their newly acquired qualifications/skills. As a consequence, I put more emphasis on the data of the vocational training courses in the National Training Register, as I believe that it is easier to find a job with a new profession and up-to-date knowledge than with, for example, IT training or competence development training. I evaluated the collected database using Microsoft Office 2013 programs.

The two counties studied are complete opposites in all economic indicators. The county of Borsod-Abaúj-Zemplén has a high unemployment rate, a relatively low employment rate and a low average net income for those working in the county, while the county of Győr-Moson-Sopron has a low unemployment rate, the second highest employment rate in the country and the highest average net income for those working in the county after Budapest.

In terms of population, Győr-Moson-Sopron county has grown by 33,000 in the last 20 years, while Borsod-Abaúj-Zemplén county has decreased by 115,000, mainly due to emigration. Many people migrate from the county to the capital and Western Hungary in the hope of a better and more secure livelihood, thus increasing the population and labour supply of the counties of Western Hungary. In both counties, unemployment is on a downward trend. Borsod-

Abaúj-Zemplén county has more than nine times the unemployment rate of Győr-Moson-Sopron county (Figure 1).

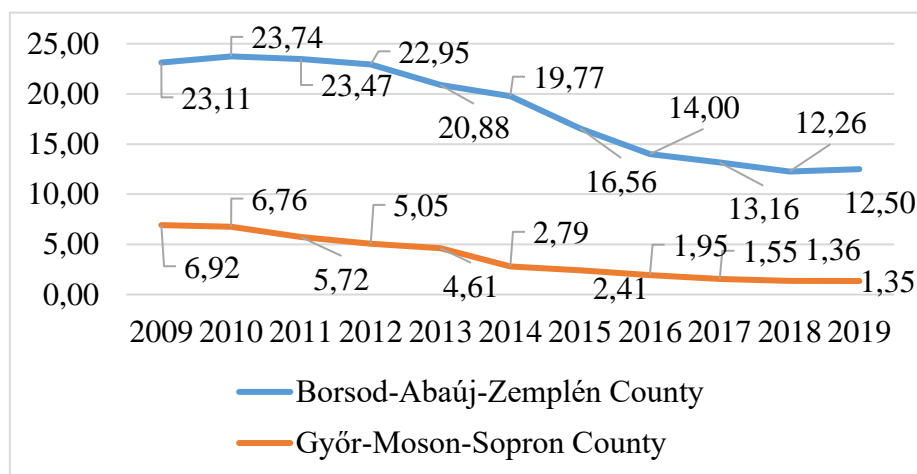


Figure 1: Relative ratio of registered jobseekers to the economically active population in Borsod-Abaúj-Zemplén and Győr-Moson-Sopron counties

Source: Based on own work (www.nfsz.munka.hu)

Results

In Borsod-Abaúj-Zemplén county, the number of unemployed persons decreased by 47.7% in the period under review, due to emigration, while in Győr-Moson-Sopron county the number increased by 4.5%, due to positive migration. In the years under review, Borsod-Abaúj-Zemplén county had the lowest number of jobseekers in 2018 (35046 persons), while Győr-Moson-Sopron county had the lowest number of jobseekers in 2010 (3052 persons). The number of job vacancies increased 2.2 times in Borsod-Abaúj-Zemplén county and 1.8 times in Győr-Moson-Sopron county during the period under review. The highest number of vacancies was recorded in Borsod-Abaúj-Zemplén county in 2018 (15,537), while in Győr-Moson-Sopron county it was 5,868 in 2017. Adult education can be a solution to reduce the number of unemployed.

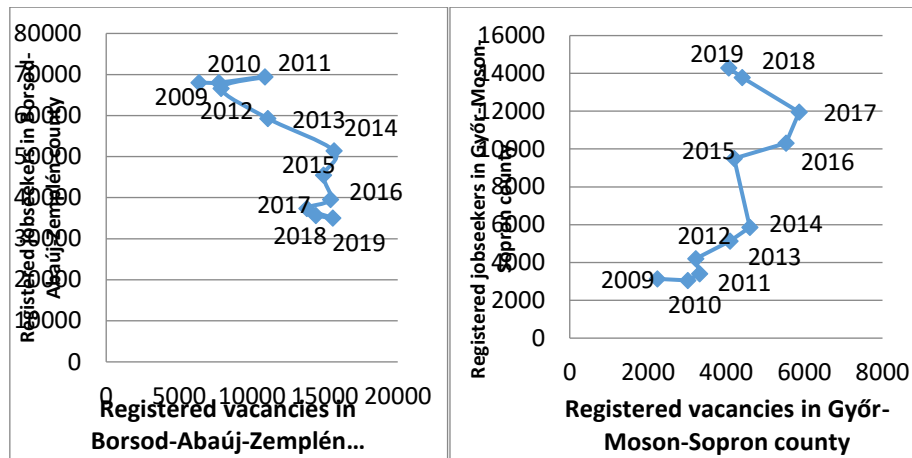


Figure 2: Beveridge curve of the number of registered vacancies and the number of registered jobseekers
Source: based on own work (www.nfsz.munka.hu)

In the 11 years under review, 520395 people in Borsod-Abaúj-Zemplén county and 446885 people in Győr-Moson-Sopron county participated in adult education. When looking at the financing of the participants in training, 24.2% of the participants in Győr-Moson-Sopron county and 15.5% of the participants in Borsod-Abaúj-Zemplén county financed their own training.

Looking at the national data, in general, the majority of participants in adult education are women. In Győr-Moson-Sopron county, the opposite has been the case over the last 11 years, with 61.9% of participants being male. In Borsod-Abaúj-Zemplén county, 47.3 per cent of adult education participants were male, so in line with the national figures. In terms of age distribution, the highest number of participants in adult education in both counties was in the 25-39 age group, with a narrower breakdown in Győr-Moson-Sopron county, where the highest number of participants in adult education was in the 25-29 age group (15.9%), and in Borsod-Abaúj-Zemplén county, where the highest number of participants in adult education was in the 40-44 age group (13.2%) (Figure 3).

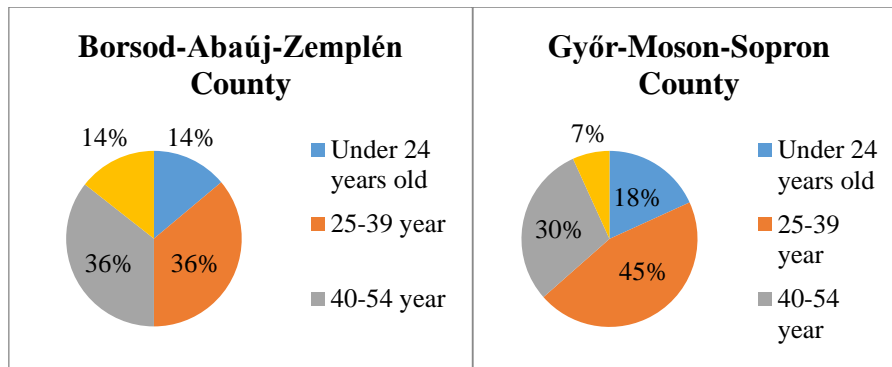


Figure 3: Age distribution of participants in adult learning (2009–2019)
 Source: based on own work (www.osap.mer.gov.hu)

The highest level of education has a strong influence on the willingness to learn and to join training, as the entry requirements for most training are specified in the training programmes. Figure 4 illustrates the differences between the two counties, especially for the unemployed. For Borsod-Abaúj-Zemplén county, the majority of jobseekers have primary school or less education, which is reflected in the number of participants in training. The county has more than three times the number of participants in adult education with primary education or less. In Győr-Moson-Sopron county, the number of people with vocational qualifications exceeds the number of participants in Borsod-Abaúj-Zemplén county by 21 thousand. There is no significant difference between those with a secondary school leaving certificate, technical school and higher education in the areas studied (Figure 4).

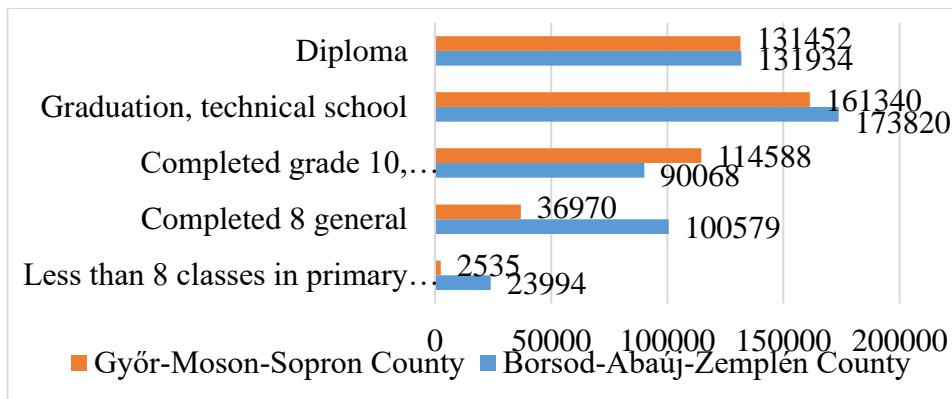


Figure 4: Distribution of participants in adult education by educational attainment (2009–2019)
 Source: based on own work (www.osap.mer.gov.hu)

Much of the training supported by the European Union is concentrated in rural areas with high unemployment. In Borsod-Abaúj-Zemplén county, the number of participants in adult education is higher than the national average because of the strong emphasis on EU-funded adult education for job seekers. In the period under review, 50 percent of all trainees (260,328) in the county were supported by the European Union. The highest level of support was in 2018, when it exceeded 71 percent. When looking at the vocational training courses included in the National Training Register, the highest funding rate in the county was 62.8 percent in 2017, but 42.5 percent of the trainees were funded by the European Union in the period under review. 12.5 percent of all participants in adult education in Győr-Moson-Sopron county (56142 persons) were funded by the European Union in the period under review. The highest level of funding was in 2014, reaching 27%. When looking at the vocational training courses included in the National Training Register, the highest funding rate in the county was in 2017 with 45.9 percent, however, 9.2 percent of the participants were funded by the European Union in the period under review (Figure 5).

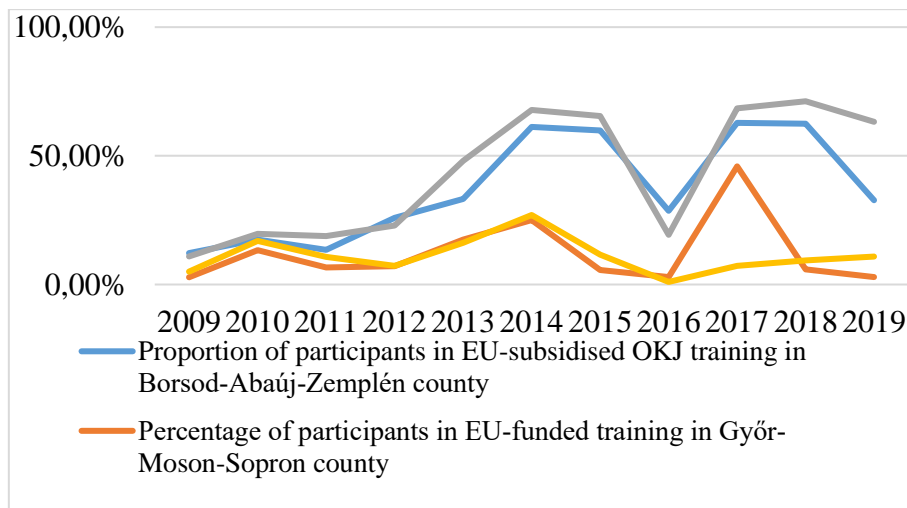


Figure 5: Distribution of EU-funded training and VET courses (2009-2019)

Source: based on own work (www.osap.mer.gov.hu)

Pearson's coefficient expresses whether there is a relationship between two or more quantitative variables and if so, how strong it is, in this case Borsod-Abaúj-Zemplén has a medium-strong relationship and inverse proportionality, while in Győr-Moson-Sopron county there is no relationship (Table 1). The coefficient of determination expresses the extent to which the independent variable explains the dependent variable. In Borsod-Abaúj-Zemplén county, the unemployment rate explains

46% of the support rate, while 54% of the support rate depends on other factors, which requires further research.

Table 1: Pearson's correlation and coefficient of determination

Year	Borsod-Abaúj-Zemplén County		Győr-Moson-Sopron County	
	Unemployment rate	Proportion of adult learning funded by the EU	Unemployment rate	Proportion of adult learning funded by the EU
2009	23,11%	10,90%	6,92%	5,00%
2010	23,74%	19,70%	6,76%	17,00%
2011	23,47%	18,80%	5,72%	10,70%
2012	22,95%	22,90%	5,05%	7,30%
2013	20,88%	48,10%	4,61%	16,20%
2014	19,77%	67,80%	2,79%	27,00%
2015	16,56%	65,40%	2,41%	11,60%
2016	14,00%	19,30%	1,95%	1,00%
2017	13,16%	68,40%	1,55%	7,20%
2018	12,26%	71,20%	1,36%	9,40%
2019	12,50%	63,20%	1,35%	10,80%
Pearson correlation coefficient	-0,682305818		0,084036128	
Determination coefficient	0,46554123		0,007062071	

Source: based on own work (www.nfsz.munka.hu; www.osap.mer.gov.hu)

Conclusions

The two counties are complete opposites in all economic indicators. Borsod-Abaúj-Zemplén county has high unemployment and a relatively low employment rate,

while Győr-Moson-Sopron county has low unemployment and the second highest employment rate in the country. In Borsod-Abaúj-Zemplén county, the number of unemployed decreased by 47.7 percent in the period under review, due to emigration, while in Győr-Moson-Sopron county it increased by 4.5 times, due to positive migration.

Of the two counties, Borsod-Abaúj-Zemplén County had more trainees in adult education due to EU-funded training, but Győr-Moson-Sopron County had a higher share of trainee-funded training due to higher average wages and participants with higher educational attainment. Uniquely in the county, men were in the majority in training.

The majority of EU-funded training is concentrated in rural areas with high unemployment. The number of participants in adult education in Borsod-Abaúj-Zemplén County is higher than the national average because of the strong emphasis on EU-funded adult education for jobseekers.

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Territorial distribution of adult training in Hungary

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Abstract

The study examines the spatial distribution of adult training in Hungary. In terms of spatial distribution, Budapest has the highest indicators in Hungary in all respects. In terms of rural counties, Borsod-Abaúj-Zemplén county and Szabolcs-Szatmár-Bereg county have the highest number of training and qualifications. In terms of participation, the volume of NQR (OKJ) training is high. In terms of EU-funded training, the level of support for the professions in the National Training Register is negligible, with general adult education being preferred by funding decision-makers.

Keywords:

adult training, spatial distribution, regions, OKJ training

Introduction

The democratisation of the Hungarian socio-political system in recent decades, the changes in the labour market and the transformation of the economic structure have forced communities and individuals to learn and to engage in education. As a result, the role of learning has become a key driver of the economy and has been enhanced (Rakaczkiné, 2010). It is a common phenomenon today that people are forced to change careers several times in their lives, and as a consequence, in order to remain in the labour market, they have to acquire a large number of new skills (Kozak – Grezda, 2020). There are two types of adult education and adult learning. Adult education tends to focus on the acquisition of specific vocational and linguistic skills, while adult learning generally focuses on the acquisition of some kind of qualification or vocational qualification in the context of school-based training (Csoma, 2005).

Adult learning involves planned, purposeful activities for the development of adults, with a focus on competences. Adult learning is defined as the vocational training, retraining and further education of adults leading to an officially recognised qualification (Zrinszky, 2010). Adult learning is geared towards the acquisition of vocational skills that meet market needs and help those who are trained to earn a legal income, thereby achieving their social integration. This has led to a number of Community policy guidelines, such as the Europe 2020 strategy for smart, inclusive and sustainable growth. One of the main pillars of the priorities set out in Europe

2020 is the creation and development of an economy based on knowledge and innovation, but also an economy that provides high employment and is characterised by territorial, economic and social cohesion (Farkas-Henczi, 2013).

Three types of adult learning motives are distinguished: interest, existential and prestige motives. Interest-based motives usually arise when an adult expects learning or education to help him/her solve a problem, or when he/she starts learning because he/she is interested in a profession or a field of study (Caragea, 2011). Existential motives motivate individuals to learn if they want to get ahead in their job or keep their position. We also talk about existential motives when the reason for joining a training course is to enter the labour market, to get a job. Prestige motives are shaped by our environment, family, friends, workplace. This type of motivation is considered as a prestige activity of learning. The ideal case is when all motives play a role in adult learning (Cincinnati et al., 2016).

Youth learning is very different from adult learning. Adults have life experiences, a non-uniform level of general literacy and professional knowledge, which education must necessarily take into account when an individual enters new studies (Simándi-Oszlánci, 2012).

It should be borne in mind in adult education that the learning outcomes of adults are individual and influenced by a number of factors, such as the life path of the participant, previous studies, experiences, which are usually associated with negative experiences, especially among those who have completed lower secondary education (Koncz-Hajdú, 2019). Beyond knowledge acquisition, the essence of adult learning is personal development, socialisation, adjustment of developmental trajectories, learning and acquiring new skills, knowledge and ways of acting (Rothes et al., 2017).

According to the Adult Education Act, the concept of adult education is complex, and adult education includes language, vocational and general training (Zachár, 2009). The legislation in Hungary today distinguishes four types of training, which are:

- "A" training circle: vocational training according to the NQR (OKJ).
- "B": other vocational training not included in the National Qualifications Register.
- "C" training category: authorised language training courses
- 'D': other training courses authorised.

Other vocational training is training for the acquisition of a professional qualification not recognised by the State, aimed at developing the competences required to perform a job and not of an official nature. Other training is training aimed at the development of competences that are not linked to either a vocational qualification or a linguistic qualification (Act LXXVII of 2013, § 2.5.).

Knowledge is the main resource of the economy, as we live in a knowledge-based society. Society, including the individual, is increasingly challenged by the constant and rapid changes in the world. The organisations of the modern economy are undergoing a huge transformation as a result of the accelerating pace of change in the demand for knowledge, and therefore require employees to continuously develop their knowledge. The population in modern society can be divided into two groups: the employed with little leisure time and the unemployed with a lot of leisure time. Moreover, training is equally important for both groups. Those in employment can only keep their jobs by continuously improving their skills, while the unemployed can only gain employment almost exclusively by improving their skills and knowledge (Halmos, 2005).

The Hungarian state and the European Union allocate significant resources to education, especially adult education (Hajdú, 2021a). The highest priority is given to the education of jobseekers to help them reintegrate into the primary labour market (Hajdú, 2021b). The training of jobseekers has not lived up to expectations, with the majority of those trained seeing training as a source of livelihood (Hajdú-Koncz, 2021). Subsidies are not evenly distributed in the municipalities of the country, resulting in the creation of untrained areas from the northern part of Kecskemét to Nagykanizsa, with no training corridors (Hajdú, 2021c). Most of the participants in subsidised training are located in the north-eastern part of the country, in Borsod-Abaúj-Zemplén county and Szabolcs-Szatmár-Bereg county (Hajdú, 2020; Hajdú, 2021d).

Material and methods

As a basis for the research, after having consulted the available national and international textbooks and journal articles on the topic, I processed the secondary data available in the OSAP 1165 Statistical Interface on a national scale. The distribution of adult education in Hungary shows a diverse picture. First, I will look at the different statistical indicators at NUTS 2 level, then I will look at the distributions, characteristics and specificities of counties. Of course, Budapest is an outperformer in all statistical aspects, and therefore, in order not to distort the picture, some of the analyses are excluded. The collected database was processed and evaluated using Microsoft Office 2013 and IBM SPSS Statistics 20.

Results

Adult learning is becoming more and more widespread in Hungary. All statistical indicators on adult education show progress and growth. In the period under review (2015-2019), the number of educational institutions licensed to provide adult education increased in all regions of the country. Over the years, many enterprises have recognised this gap in the market, which the existing public education institutions could no longer fill. In terms of the number of training institutions, the

Central Hungary region stands out in the country, mainly due to Budapest and its agglomeration. This was followed by the Northern Great Plain region, which, due to the economic decline and high unemployment in Szabolcs-Szatmár-Bereg county, has become one of the main centres of EU-funded training, together with Borsod-Abaúj-Zemplén county, which is located in the Northern Hungary region. As Table 1 shows, in regions where unemployment is not a problem, there are far fewer institutions and enterprises providing adult education.

Table 1: Number of training institutions by region (2015-2019)

Number of training institutions by region (2015-2019)					
Regions	2015	2016	2017	2018	2019
Southern Great Plain	114	128	141	143	153
Southern Transdanubia	89	90	102	103	99
Central Transdanubia	98	96	107	109	108
Central Hungary	643	623	651	673	738
Western Transdanubia	110	112	109	116	134
Northern Great Plain	167	156	190	191	204
North Hungary	88	92	107	112	121
Total	1309	1297	1407	1447	1557

Source: based on my own work (www.osap.mer.gov.hu)

In terms of the number of training courses, each county shows an increasing trend. As Figure 1 illustrates, with the exception of Győr-Moson-Sopron county, all the counties in Western Hungary dwarf the counties in Eastern Hungary. The figure does not include Budapest because it is very distorted. In the capital city, 107,959 training courses were carried out in the last 5 years, which is 48.9 percent of all training courses under the Adult Education Act in the country.

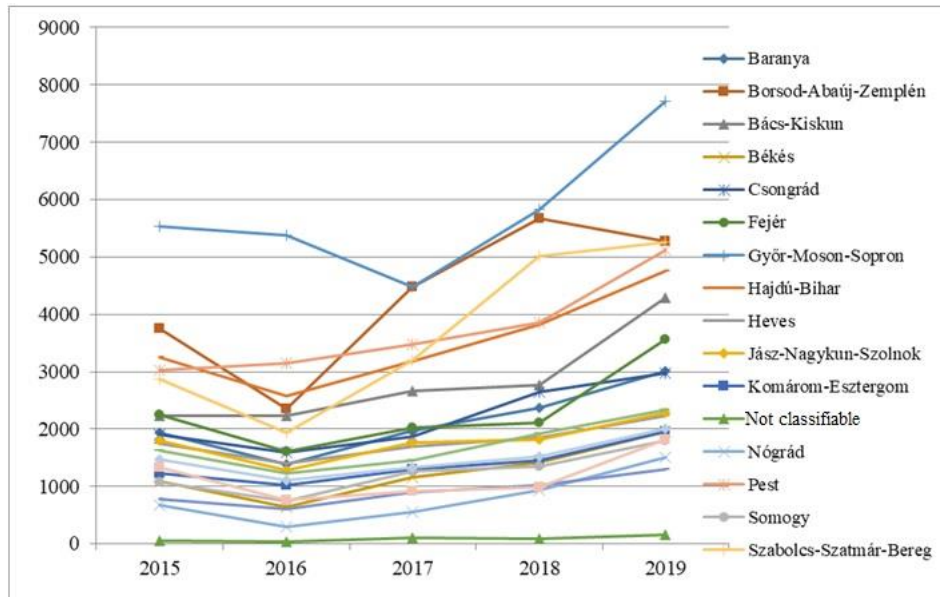


Figure 1: Number of training courses by county

Source: based on own work (www.osap.mer.gov.hu)

In the last 5 years, there have been almost 330,000 apprenticeships in our country, of which almost 72% were based on an 8th grade or lower education. Of the training palette implemented, the share of training based on school-leaving qualifications was 11.5 percent, suggesting that the share of participants in general adult education is much higher than in the vocational training courses in the National Register of Vocational Education and Training at secondary level, as training courses, language and IT courses all require the completion of grade 8. The share of college as an entry requirement for training (3%) is mainly due to vocational and teacher training.

The number of pupils has been increasing in the years under review. As Figure 2 illustrates, the predominance of courses with less than 8th grade education and with a completed 8th grade was also evident. The number of participants in courses based on a college degree shows a decrease, while the number of courses based on a university degree has stagnated, with a slight increase.

Table 2: Number of training courses (courses) by entry criterion for training

Number of training courses (courses) according to the entry criterion for access to training					
Minimum level of education required to join the training	2015	2016	2017	2018	2019
less than grade 8 in primary school	10970	10206	15661	19505	21597
school leaving certificate at the end of grade 8	29957	28051	29744	32500	37689
vocational school	887	840	761	775	879
special vocational school	16	15	11	46	43
remedial education	19	21	26	17	25
apprenticeship school	2018	1496	1648	1778	2309
vocational secondary school	5719	5439	5145	5938	6099
high school	1527	1745	1983	2040	2230
technical college	24	19	17	22	28
college	3154	709	1178	1647	2557
University	89	22	16	70	225
completed grade 10	232	312	369	376	448
12 years of upper secondary vocational school completed	592	499	314	256	241
completed high school grade 12	122	218	184	116	128
input competency assessment (at OKJ level 3)	538	300	238	428	360
higher vocational education	467	156	158	286	327
variable requirement	2386	2341	3499	5281	10095
Total	58717	52389	60952	71081	85280

Source: based on my own work (www.osap.mer.gov.hu)

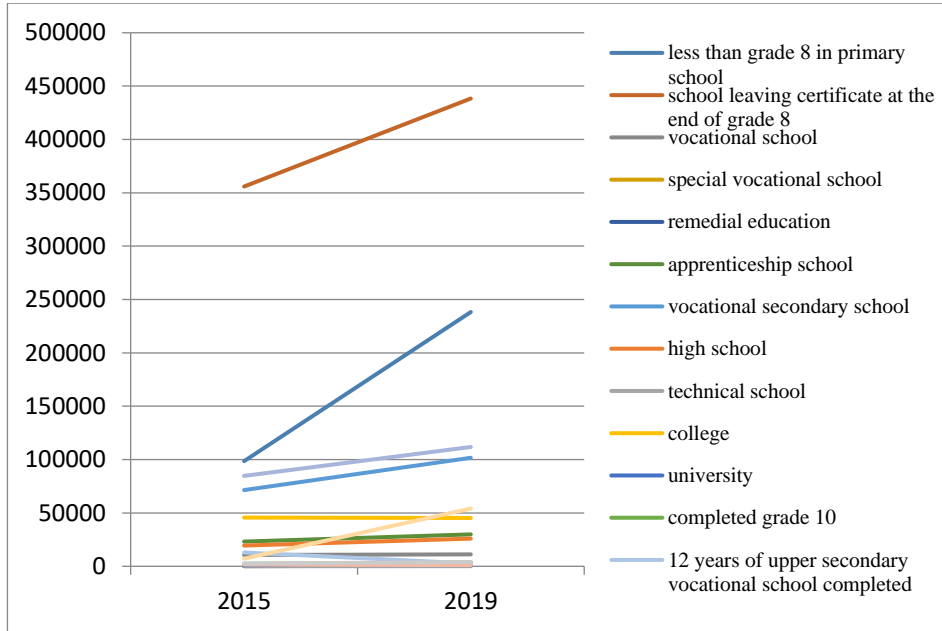


Figure 2: Number of graduates by entry criterion (2015 and 2019)
 Source: based on my own work (www.osap.mer.gov.hu)

Under the Adult Education Act, training can be divided into 13 groups according to the type of training. Table 3 shows a steady increase in the number of participants in the years under review from 2016 onwards. The number of trainees completing the training is an important indicator of the success of the training.

Table 3: Number of graduates by type of training (2015-2019)

Number of graduates by type of training					
Type of training	2015	2016	2017	2018	2019
initial vocational training leading to a professional qualification	4123	3801	5994	4638	3997
State-recognised OKJ vocational qualification	139178	130169	150085	164030	171658
a non-OKJ level qualification for the job or occupation	83600	51480	50634	49400	60700

vocational training	207474	140398	158176	176739	267076
remedial training for disadvantaged people	7822	1501	5559	10451	7322
training for employment, entrepreneurship	5419	2736	4417	5953	12872
training for qualifications of an official nature	53923	72098	62735	75059	94367
training for the qualification of chartered accountant	453	432	341	361	290
language training	55028	47176	43328	46106	57047
general adult training	144805	111326	113314	210547	264053
rehabilitation training for people with disabilities	859	55	63	318	361
IT training	33118	23510	103345	126162	131482
preparing for input competences	1808	8429	862	2055	1059
Total	737610	593111	698853	871819	1072284

Source: based on my own work (www.osap.mer.gov.hu)

In total, the largest number of participants in the period under review (949,863) were in the continuing vocational training group, due to the fact that many jobs (e.g. teachers) require them to undertake mandatory training on a points basis and they can only continue their activities if they obtain the mandatory training points. The second highest number of participants (844,045) is in the general adult education group, which includes training courses that have been a huge success in our country over the last 10 years. The third group with the highest number of participants (755,120) is the group of state-recognised OKJ qualifications. From a labour market perspective, this group is the most important, as a new profession and qualification is more likely to lead to a job than training. The three groups listed by type of training account for 64.1 per cent of all training in the country in the last 5 years and are the most important in terms of adult learning in Hungary today.

Figure 3 shows that the number of training completers by county has increased year on year in almost every county. Budapest, as the capital city with the largest number of trainees (1,519,793), has been omitted from the figure because it distorts the picture. Budapest covers 61.9% of the country in terms of the number of graduates. In total, 2,453,884 persons completed adult education in Hungary in the last 5 years. The distribution by county shows that the two counties with the highest unemployment potential in the country had the highest number of participants, although Borsod-Abaúj-Zemplén county saw a decrease in the number of completers in the last year under review, due to a reduction in the number of courses, as shown in Figure 1.

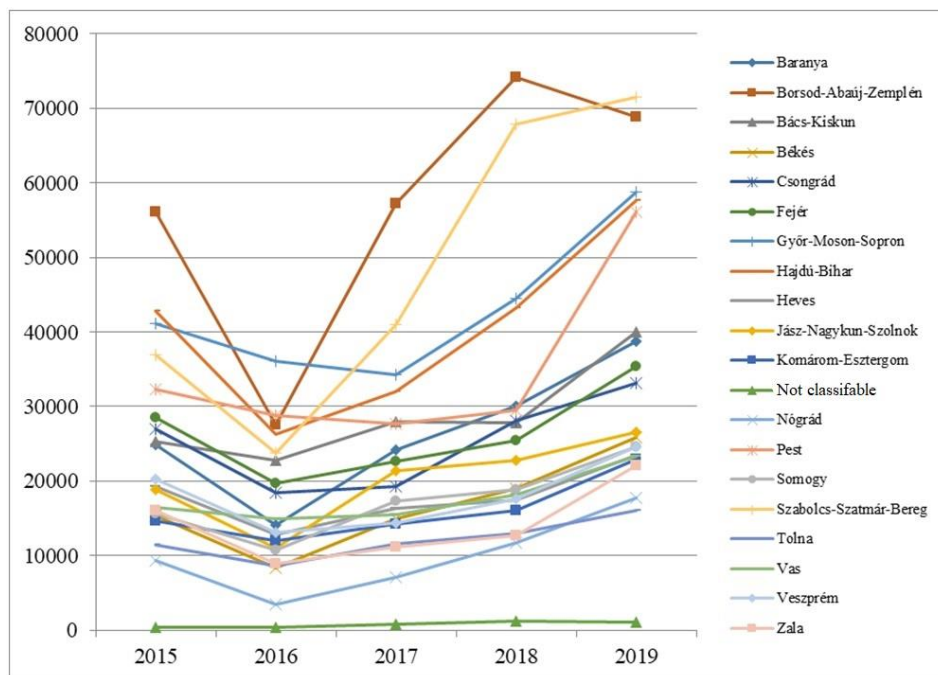


Figure 3: Distribution of training completers by county (2015 and 2019)

Source: based on own data (www.osap.mer.gov.hu)

Nógrád county is one of the counties with the highest unemployment in Hungary, which is surprising as it has the lowest number of training places and groups. The figure clearly shows that of the developed counties in Western and Central Hungary, only Győr-Moson-Sopron county stands out. Hajdú-Bihar county and Pest county showed the highest growth. In the years under review, all counties showed a decline in 2016, due to the structural changes that came into force on 1 February 2016.

The distribution of training courses by number of hours is shown in Table 4. Most courses and training in the country were less than 200 hours, accounting for more

than 90 percent of all training in the country. Courses of less than 200 hours were generally training courses, part-qualifications, language courses and IT courses. As training courses have been a great success in adult learning over the last 5 years, they dominate in all indicators. For training courses over 201 hours, we can generally speak of training courses with an OKJ. The most striking were the training courses over 2001 hours, almost 80 percent of which were in Borsod-Abaúj-Zemplén county.

Table 4: Distribution by number of hours of training (courses)

Number of training courses (courses) by number of hours						
Duration	2015	2016	2017	2018	2019	Total
Between 1001 and 2000 hours	406	423	540	697	643	2709
200 hours or less	52312	47229	54793	64059	78961	297354
More than 2001 hours	33	23	3	2	16	77
Between 201 and 400 hours	3702	2638	3260	3804	3341	16745
Between 401 and 600 hours	1690	1219	950	878	872	5609
Between 601 and 800 hours	207	247	490	664	628	2236
Between 801 and 1000 hours	367	610	916	977	819	3689
Total	5871	5238	6095	7108	8528	328419

Source: based on own data (www.osap.mer.gov.hu)

Most of the training courses in the National Qualifications Register were in groups of 200 hours or less. Most of the courses in the National Qualifications Register with less than 200 hours are part-qualifications.

Table 5: Number of OKJ training (courses) by duration (2015-2019)

Number of OKJ training courses (2015-2019)						
Duration	2015	2016	2017	2018	2019	Total
Between 1001 and 2000 hours	373	406	533	689	636	2637
200 hours or less	6034	6323	6534	7412	8386	34689
More than 2001 hours	31	21	2	1	15	70
Between 201 and 400 hours	2039	1832	2662	2781	2680	11994
Between 401 and 600 hours	1022	1055	779	643	691	4190
Between 601 and 800 hours	126	180	383	537	568	1794
Between 801 and 1000 hours	348	587	897	933	806	3571
Total	9973	10404	11790	12996	13782	58945

Source: based on own data (www.osap.mer.gov.hu)

Budapest had the highest number of participants in the National Training Register, but one of the lowest numbers of participants in the capital in terms of funding. At the county level, the highest number of participants was in Borsod-Abaúj-Zemplén and Szabolcs-Szatmár-Bereg counties, which also had the highest proportion of beneficiaries.

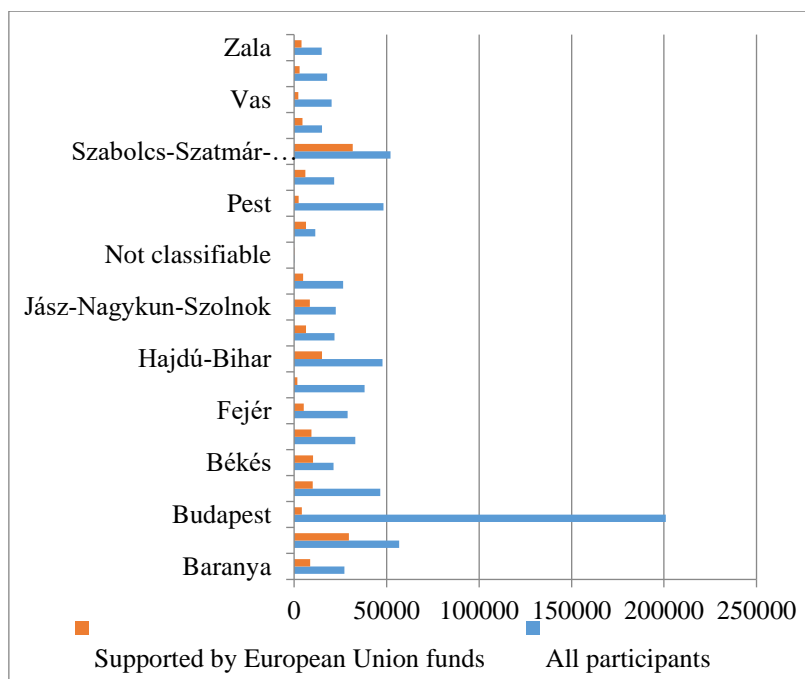


Figure 4: Number of participants in EU-funded and non-EU-funded VET
Source: based on own work (www.osap.mer.gov.hu)

In Hungary, a total of 773,554 people participated in adult education in the professions listed in the National Training Register in the last 5 years, which is unfortunate that only 22.5 percent of this number was supported by the European Union.

Conclusions

In Hungary, the number of institutions and businesses with adult education licences is constantly increasing, which is important because adult education is the only way to respond to changes in the labour market and provide solutions. The number of training courses is constantly increasing in the country, especially in Eastern Hungary. Budapest distorts all adult education indicators because of its high participation rate, and of course most adult education institutions are located here.

In terms of the entry criterion to training, training courses with 8 general qualifications or less were in the majority, driven by training courses, catch-up courses and level 3 NQR courses. From 2015 to 2019, the number of training courses increased by 45 percent.

The group with the largest number of participants by type of training was the continuing vocational training group. The occupations listed in the National

Training Register were only third in the ranking. In my opinion, from a labour market point of view, learning a new profession has a much greater labour potential than general adult education training, so the distribution of European Union funding should be directed towards vocational training.

In terms of the distribution of training hours, both the participants and the subsidies favour training of short duration (less than 200 hours). This is perfectly understandable in the case of training or language training, but it is disappointing for training in the field of the , since 200 hours are not enough to learn a new profession, especially if the new qualification is to enable the new graduate to carry out his/her work immediately, safely and with the required quality.

There is a high level of participation in vocational training in the field of the OKJ, but the level of support is negligible. In my opinion, the preference for vocational training should be increased, both from the point of view of employees and the economy.

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Patterns of migration into rural areas in the villages of Gyöngyös district

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Abstract

Stabilising the demographic situation in rural areas is a key objective of rural development. Some of the human resources lost in the past can be regained by moving well-off people (young, educated, high income earners) into villages. The aim of our research was to examine the actors and motives of migration into rural areas based on the characteristics of the rural way of life. Our questionnaire surveys were carried out between 2016 and 2019 in 18 villages of Gyöngyös District. In recent years, more and more settlements in the district have become a favourite destination for immigrants. In the five years between 2015 and 2019, 14 out of 22 villages had a positive migration balance. In other words, not only those which are adjacent to the centre of the district or which are in a particularly favourable geographical position. From our questionnaire survey, it is clear that more and better living space is the most important motivation for moving to the countryside. Potential difficulties, such as fewer job opportunities or less developed infrastructure, were anticipated by those moving in. The socio-economic indicators of immigrants were statistically significantly more favourable than those of the native population. The potential of the rural way of life (food self-sufficiency, connection to the local community) was less exploited than by the indigenous people, but there was evidence of improvement over time.

Keywords

migration, suburbanisation, counter-urbanisation, rural areas, local communities, self-sufficiency

Introduction

The population in rural areas of the European Union is on average older than in urban areas and is projected to decline gradually over the next decade. If rural areas are associated with poor infrastructure, limited employment opportunities and limited access to services, they will become less attractive for people to settle and work. The long-term vision for rural areas in the EU aims to find solutions to these challenges and concerns. In doing so, it seeks to build on the potential of the EU's green and digital transition and the lessons of the Covid19 pandemic, and to find ways to improve the quality of rural life, ensure balanced territorial development and stimulate economic growth (ec.europa.eu). In the course of our research, we conducted a questionnaire survey in rural settlements of Gyöngyös District to find out which factors are the main attractions of moving to the countryside, how much people moving to the countryside are involved in activities specifically related to the countryside and how satisfied they are with the opportunities available in the countryside.

Literature review

For Hungary, Lennert and Farkas (2019) project that rural depopulation will continue to decline over the next 30 years. The ageing of the country's population, especially in rural areas, is expected to continue, and rural areas will also lose out from the migration process. It is expected that only small settlements in the Budapest agglomeration will experience significant, measurable population growth. The negative trends continue to justify the implementation of measures to increase the population retention and attractiveness of rural areas.

The ability to migrate is a fundamental condition for people and families to have access to certain material and human resources, economic, social and cultural capital. It is the only thing that allows them to decide whether to leave or stay, and determines where they can go and under what circumstances. In this way, the different types of capital, resources and thus the ability to migrate are distributed very unequally in communities, in society (Váradi et al., 2017). Most authors analyse migration into rural areas in the context of urbanisation processes. The biggest debate in the international literature has been whether to place the phenomenon in the context of suburbanisation or counter-urbanisation. The counter-urbanisation debate began in the 1970s in the United States, where researchers first drew attention to the fact that population in non-metropolitan America was once again on the rise. Beyond definitional uncertainty, the key issue in the analysis of counter-urbanisation and suburbanisation, and the most controversial one, is the motivation for moving. One view is that the desire for the countryside, i.e. the rural life and environment, motivates people to move out, giving them a fresh start and a clean slate (Hardi, 2002; Csapák, 2007). In contrast, the opposite view is that migration is driven by the geographical redistribution of the determinants of quality of life (jobs, housing, services and security), which forces people to migrate (Timár, 2001; Koós 2007).

The attractiveness of rural areas is therefore a complex phenomenon, determined by a number of factors. Much of the literature emphasises ruralness, green space and the consumption of amenities as explanatory factors in stimulating urban and rural movements. This is illustrated by Gurran's (2008) study of 'convenience-based' migration to coastal suburban areas in Australia, or Van Dam et al.'s (2002) research on rural-to-rural migration in the Netherlands. In the UK, Smith - Phillips (2001) use the term 'greentrification' to emphasise the attractiveness of green space and the countryside in managing rural in-migration. Sweden, like the rest of Europe, is experiencing rapid urban growth, but many rural areas are also struggling with population decline. Despite this general trend, there is also a counter-flow of people leaving metropolitan areas (Hansen-Aner, 2017). Families with young children as actors in migration flows from metropolitan areas (Niedomysl-Amcoff, 2011). Immigrant working couples with young children are particularly attractive to local

communities as they help to offset population decline and ageing and also contribute to the regeneration of the rural economy (Roberts–Townsend, 2016). The phenomenon of "downshifting" is increasingly emphasised in lifestyle migration research (Verdich, 2010). This means that immigrants most often cite achieving a better quality of life, family engagement, environmental concerns and a less stressful lifestyle as the main motivating factors. Some case studies have shown that immigrants are more likely to be involved in entrepreneurial activities than natives and that this self-employment contributes significantly to the development of local communities (Mitchell - Madden, 2014).

In Hungary, suburbanisation became one of the most characteristic phenomena of inward migration after the 1990s. According to surveys, people of higher social status and younger age groups in Hungary are the most likely to move out of cities. For the out-of-town group, the main motivation for moving out is the need for more comfortable housing and a green environment (Tamáska, 2006).

The results of a national questionnaire survey by Bajmócy (2001) show that natural advantages are a decisive factor for villages, with very good results in terms of both the natural environment and air purity and quietness. Villages also have a significant advantage over cities in terms of neighbourhood and public safety. In addition, in Hungary, as in the case of classic western suburbanisation, the need to own a house is a decisive factor in moving out of cities. Of course, this is not surprising, as most of the people moving out come from apartment blocks and blocks of flats. One of the characteristics of suburbanisation in Hungary is that the role of the garden and farming is much greater than in Western European processes.

Material and methods

Following a review of the relevant literature on migration into rural areas, we examined the secondary databases of the HCSO to see how the migration balance of the villages in the primary research study area changed in the period of 2015-2019. The district of Gyöngyös consists of 24 settlements, where, in addition to the central small town, there is one settlement with urban status. The region has a diverse range of endowments, and its population processes are fundamentally influenced by the fact that it is located on the outskirts of the ever-expanding agglomeration of Budapest. Between 2016 and 2019, we conducted several questionnaire surveys in the villages of Gyöngyös district with the participation of our rural development agricultural engineering students, which resulted in a total of 1607 evaluable questionnaires. The primary data collection covered a total of 18 villages. Although the studies covered different topics, they all included the same questions on the attractiveness of rural areas and migration to the countryside, and how people living in rural areas perceive the advantages (and disadvantages) of living in a rural environment.

Results

On the map illustrating Hungary's domestic migration balance, it is striking that only very few settlements within tens of kilometres of the capital have a negative value in the five years under review. Extensive contiguous areas with a positive migration balance are still found in the northern part of Transdanubia and around Lake Balaton, while in Eastern Hungary there are no such extensive areas far from the metropolitan agglomeration. (Figure 1). In the examined period between 2015 and 2019 in Gyöngyös District, 14 out of 22 villages had a positive migration balance. On an annual average, Vámosgyörk, Abasár and Visonta had a migration gain of more than 1%. In addition to Gyöngyös, some disadvantaged villages (e.g. Gyöngyösoroszi, Halmajugra), but also formerly popular settlements such as Gyöngyössolymos or Gyöngyöspata, which has been granted urban status, were characterised by significant negative effects. Some previously less popular municipalities have improved their position significantly, either due to new investments or simply because of the price conditions in the real estate market.

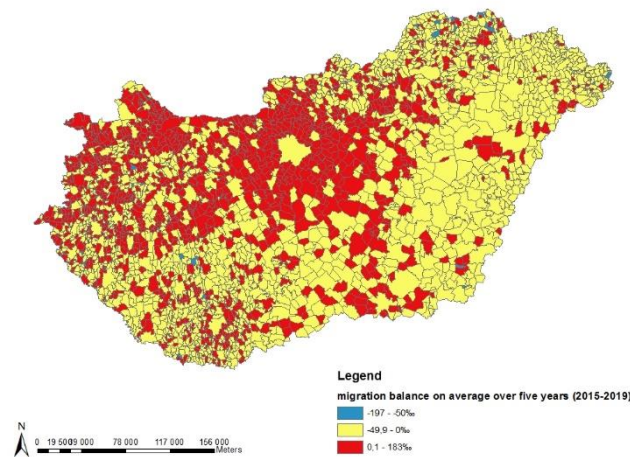


Figure 2. Domestic migration balance in Hungary's municipalities averaged over 2015-2019 (%)
(1) Own editing based on data of HCSO (ksh.hu)

Our questionnaire surveys showed that the age group most affected by rural migration is the 31-45 age group. Therefore, the proportion of graduates and the economically active is higher in this group. Although 46% of immigrants worked locally, the proportion of commuters is higher in their group, long distances are more common, but their income is also higher. Among those moving to rural areas, fewer job opportunities or poorer infrastructure were generally not a major problem. Rather, in a few cases, disappointment was caused by a housing

environment that did not meet expectations. Only about a fifth of respondents had considered leaving their village, 90% of whom would not stay in the countryside.

The motivation for moving to the countryside is often the possibility of food self-sufficiency. While 62.4% of the indigenous population produce at least some fruit and vegetables for themselves, the figure for immigrants is only 56.5% (Figure 1).

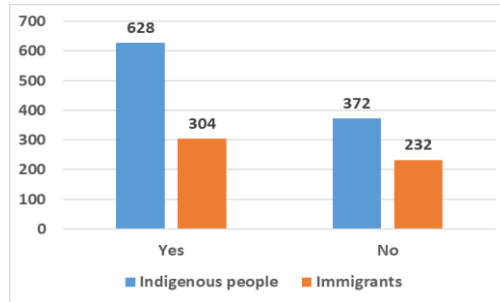


Figure 2. Fruits or vegetables grown for self-sufficiency (number of mention, N = 1536)
 (1) Own editing based on questionnaire surveys in the Gyöngyös district (2016–2019).

For those moving out of urban apartment blocks, this still offers great opportunities. The share of people who are also involved in animal husbandry is only 22% and there is no significant difference between natives and immigrants. Compared to indigenous people, immigrants have stronger ties to the settlement and natural environment than to the village community. They are less active in NGOs and local events, although this increases significantly over time (Figure 2).

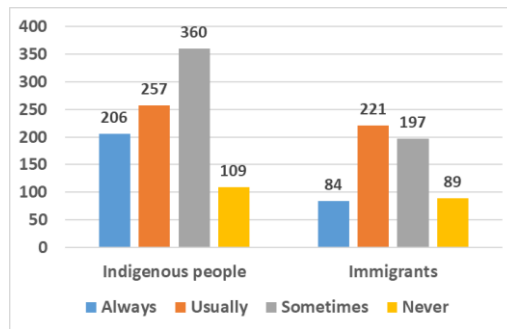


Figure 3. Participation in local events (number of mention, N = 1523)
 (1) Own editing based on questionnaire surveys in the Gyöngyös district (2016–2019).

We examined the extent to which the data on the migration balance provided by the Central Statistical Office are consistent with the opinions of the population surveyed on which rural settlements provide the most favourable living environment for their

residents at the end of 2010's. In this respect, we have observed different manifestations of the processes of suburbanisation and counter-urbanisation distinguished in the literature. In our previous study, we wrote that the small size of Gyöngyös means that suburbanisation processes are less visible in the area, and that a significant proportion of those moving in come from other cities (Szűcs–Koncz, 2018).

In addition to the outskirts of the town, suburban residential areas have been developed in some nearby settlements (e.g. Gyöngyössolymos, Gyöngyöstarján) to a high standard that meets today's housing needs. The popularity of these settlements has driven up the value of other properties, making them unaffordable for many families. Changes in property prices, better financing opportunities and improved infrastructure have also made distinctly rural settlements more popular in recent years.

Conclusions

The results of our studies in the Gyöngyös District are in many cases in line with the phenomena reported in the national and international literature. Due to the specificities of the district, the number of migrants is not so high, but the change in the situation of the settlements is still visible. The quality of the living environment is considered to be a determining factor for moving to the countryside. The typical disadvantages of rural areas are usually a foregone conclusion for people moving to the area. The relative proximity of the capital, improved transport links and job-creating investment have also made new villages (not the best endowed) popular for immigrants. However, past popularity has driven up property prices in some villages to such an extent that they are now causing a migration loss, even though people living in the area would still find them attractive.

Summary

The European Union and Hungary consider it an important task to stop and reverse the negative demographic trends (and their consequences) in rural areas. Technological development and infrastructural improvements are helping to ensure that it is not only the agglomerations of large cities that are the destination of emigration. However, people's choices can be influenced by a number of factors, weighing up the pros and cons when choosing where to live. One of the most important of these, of course, is the match between real estate market prices and financial opportunities. Rising house prices may make settlements further away from the centres the destination for migration into rural areas. As a result, the Gyöngyös District is becoming more and more closely connected to the metropolitan agglomeration and its rural settlements are in an increasingly better position. Those moving to rural areas see the disadvantages of a less favourable geographical location as surmountable. However, the characteristics of the rural way of life are less characteristic of immigrants, just as integration into the local community can take decades.

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Effect of the coronavirus on the economic situation of wines in the Northern Hungary Region

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Abstract

In the early spring of 2020, the emergence and spread of the new type of COVID-19 coronavirus infection in Hungary knocked the Hungarian economy off its feet. In the spirit of prevention, a number of social and economic measures related to epidemic management have been introduced, affecting all sectors of the national economy. The effects of these measures, with a few exceptions, have typically led to a recession in our economy, to a lesser or greater extent. The extent of the impact depended largely on the export exposure, import dependence and nature of the given sector of the national economy, and last but not least on its resilience, situational awareness, adaptability, and responsiveness based on the resources and creativity of the actors. At the regional level, the present study analyzes and interprets the impact of the economic and social crisis caused by COVID-19 on the wine sector in the wine regions of Upper Hungary and Tokaj. In light of the results of the research, the authors make a proposal to increase the level of resilience in the sector.

Keywords:

coronavirus, COVID-19, winery, economy, crisis

Introduction

In March 2020, the Government of Hungary introduced strict measures to control the coronavirus epidemic, which has led to a reduction or, in worse cases, a shutdown of production in many industries. Businesses in Hungary, especially those involved in trade, may find the solution in changes to their supply chains to boost the economy (Koppány, 2020).

After the first wave of the pandemic, our economy has started to reboot. The strategic importance of food and agribusiness has come to the fore as the pandemic has occurred, as food security must be ensured. In the context of agriculture, there can be no question of production and supply processes being halted, and as a consequence, the restarting of the industry, while continuing to be maintained, has a different substantive importance in the agricultural sector than in those sectors where there has been a de facto halt. Experience has also shown the need for a redesign of the agricultural sector, which has brought the need for generational change in the sector back to the forefront, which can also lead to an improvement in the competitiveness of the sector (Szinay and Zöldréti, 2020).

The global economic crisis caused by the coronavirus differs significantly from the economic crises experienced in the last century, as the crisis does not originate

from the functioning of the economy and the factor that caused it cannot be eliminated by economic solutions (Czeczeli, 2020).

The economic downturn associated with the coronavirus epidemic is expected to hit the country's disadvantaged regions hardest, as they have the lowest financial savings, lower than average education levels and less favourable employment opportunities than other regions. It may also lead to the return of expatriate workers, as the economy and jobs will be similarly affected (Koós, 2020).

Health is the most important resource we use in our daily lives. It is in the social and individual interest to maintain our health, as workers are an essential part of the transformation process. The coronavirus epidemic has shown that there is a close link between health and the economy. Many jobs were lost as a result of the epidemic, while government measures had a negative impact on work in other sectors. As a result of the above effects, unemployment increased, leading to negative economic impacts (Huszka et al, 2020).

Material and methods

As a basis for our primary research, after reading domestic and international textbooks and journal articles available on the topic, the questionnaire database was evaluated using Microsoft Office 2013 and IBM SPSS Statistics 20.

The questionnaire was conducted in two wine regions of the North-Hungarian Region, the Upper-Hungarian wine region and the Tokaj wine region, these two wine regions can be divided into four wine regions, the Bükk, Egri, Mátra and Tokaj wine regions. The questionnaire was administered in September 2020 and the completion was personally supervised. A total of 80 people completed the questionnaire. The questionnaire consisted of forty questions, including questions on the size of the winery, turnover, export exposure, subsidies, production and staff composition. Between 20 and 20 people were interviewed in each wine region, in which we tried to interview enterprises with different economic positions.

Results

The coronavirus has also negatively affected the domestic economy, including the north-hungary region, which is one of the regions with the worst economic indicators in the country. Many workers lost their jobs in the negative economic crisis caused by the epidemic and government decisions. The economic crisis caused by the epidemic has mainly affected tourism and hospitality. Based on the damage caused by the coronavirus in march 2020, the number of unemployed people started to increase drastically in the counties in the study area. Among the counties surveyed, the county of borsod-abaúj-zemplén had a decreasing number of unemployed in the first month of the virus compared to the previous year. Heves county had the most negative increase in terms of proportions (Figure 1).

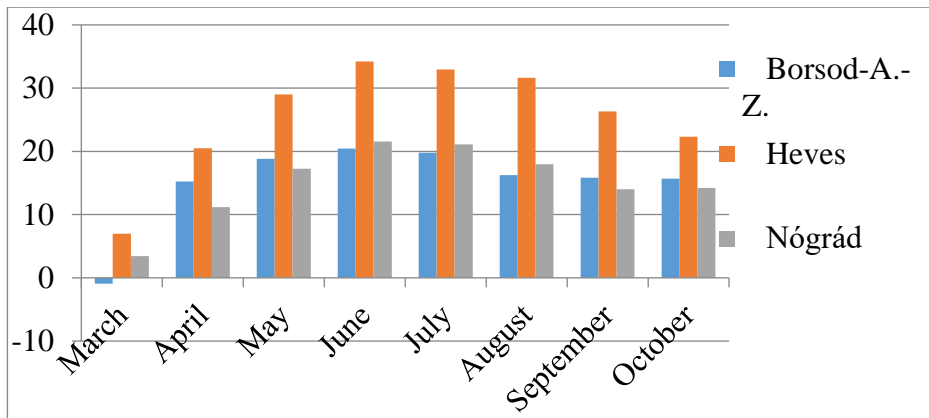


Figure 1: Changes in the rates of unemployment data for 2019 during the coronavirus period in the counties of the Northern Hungary Region (%)

Source: based on questionnaire survey (2020) own ed.

As with all economic operators, the coronavirus has had a negative impact on wineries. In general, wine businesses can be present in 5 different markets, namely the Wine Trade, Retail, On-trade, Multi and Export markets. As Figure 2 illustrates, in all four wine regions, the on-trade market has been the most negatively affected, as hotels, restaurants and cafés were temporarily closed during the first pandemic period, in line with government decisions, and were unable to participate in the production cycle. Almost all of the 5 markets have seen a decline, but the multi- and export markets have seen growth in wine regions. The Tokaj wine region was the most affected by the decline in the export market, but the Egri and Mátra wine regions grew in the same period.



Figure 2: Market downturn in wineries in the first wave of the coronavirus

Source: based on questionnaire survey (2020) own ed.

The marketing channels of wineries are different. It is striking that all wineries have direct winery sales, but far fewer are present in the online marketplace and fewer have their own representation system (Figure 3). 75% of respondents entered the online trade during the epidemic period and therefore did not have a mature sales channel. Most of the wineries with an annual production of over 200,000 bottles are the most likely to use their own agency system and those with over 100,000 to use a wholesaler.

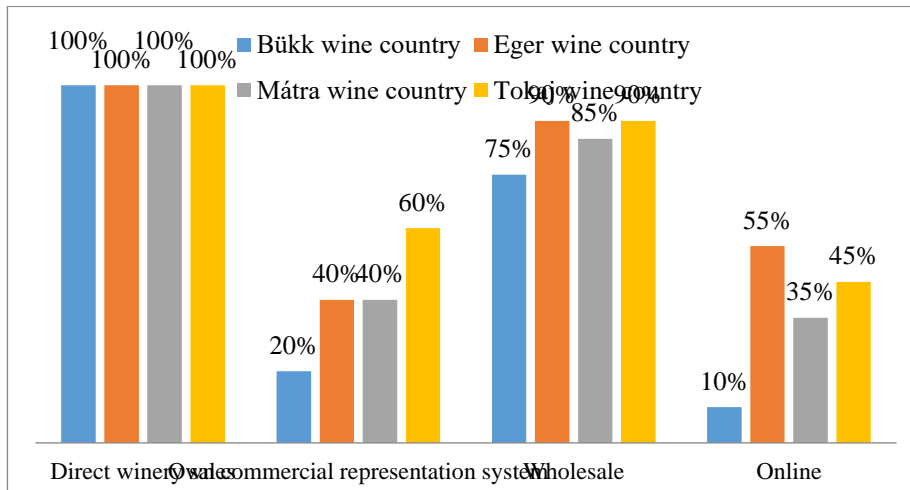


Figure 3: Distribution of sales channels used by wineries in the wine region
 Source: based on questionnaire survey (2020) own ed.

The first wave of the coronavirus outbreak mainly affected tourism and hospitality. Most wineries are involved in tourism with wine tastings. The biggest drop in tourism for wineries was the decline in wine tastings. The biggest decline was in the Bükk wine region, where winegrowers collectively reported a 100% decline, and the smallest decline was in the Tokaj wine region, where there was only a 70% drop. Few winegrowers have restaurants and paying accommodation, but those who do own such facilities have opted for forced leave and temporary closure and have introduced the integration of workers into other jobs.

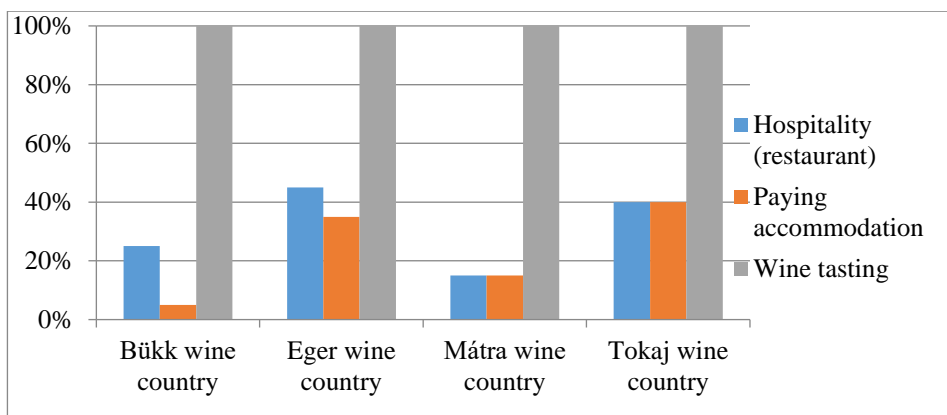


Figure 4: The economic attachment of wineries to tourism by wine region
Source: based on questionnaire survey (2020) own ed.

All the wine regions in the North-Hungary region have been negatively affected by the economic impact of the coronavirus epidemic. The wine region of Upper Hungary was less affected than the Tokaj wine region. The surveyed winegrowers were affected differently by the impact of the epidemic. 91.2% of the 80 wineries surveyed were negatively affected, while 7 wineries achieved positive economic results compared to the previous year. When interviewed, it was pointed out that the projected economic growth should be taken into account in the calculation of the reduction in income. The wineries most affected by the COVID-19 virus were those that had already been operating with a high export activity. The wineries surveyed in the Tokaj wine region all have a high export activity and mostly sell to the Asian market. For the Egri and Mátra wine regions, while their export markets have increased, their other markets have decreased, so the economic growth associated with export growth has not resulted in a growth that has not led to a decrease in economic activity compared to the previous year. The decline in turnover was also exacerbated by the absence of festivals, concerts and the shift in the number of weddings (Figure 5).

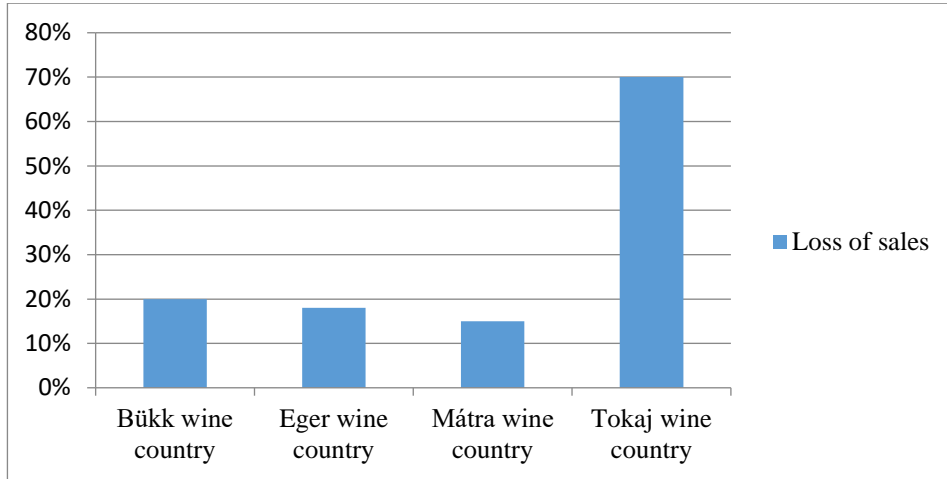


Figure 5: Loss of sales of wineries compared to the same period last year
Source: based on questionnaire survey (2020) own ed.

48.75% of the wineries surveyed were able to take advantage of the support offered by the state. Most of them saw the green harvest subsidy as a way to mitigate negative economic factors. Of the two wine regions, the Tokaj wine region benefited from aid in relation to the number of respondents. Overall, 3 of the 80 wineries received job retention aid. 60% of all winegrowers would have liked to participate in the job-retention grants, but only 3 wineries met the criteria (Figure 6).

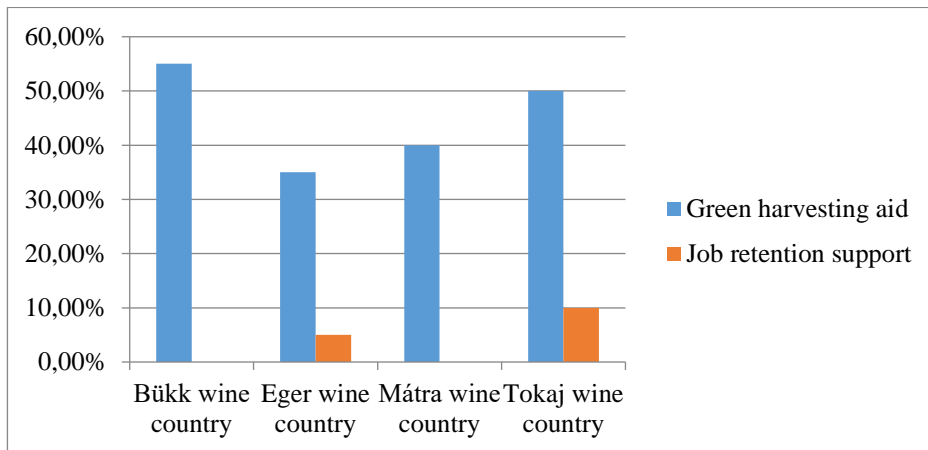


Figure 6: Participation rate of wineries in subsidies
Source: based on questionnaire survey (2020) own ed.

The rise in the euro exchange rate has made things more expensive for wineries. All the wineries surveyed import bottling equipment such as wine bottles, stoppers and corks from abroad. Most of them import the above mentioned equipment from Slovakia and Italy. The rise in the exchange rate has led to an increase in the price of raw materials, which the revenue has not been able to compensate. The least affected by the exchange rate increase were wineries that earned euro income from their export activities and wineries that had stocked up on the necessary raw materials at the end of last year (2019).

85% of the winemakers surveyed have wine in stock. The majority have 2019 vintages left on the shelves. For them, this has resulted in significant revenue.

Respondents have tried to preserve their income in different ways. The majority (90%) tried to protect their sales by going online. In addition, they attempted to preserve their turnover by price promotions and promotions on the Grasstops (77.5%). The integration of new commercial channels was considered important by 82.5% of winegrowers. Few saw marketing activities as the solution, with only 15% investing in them. In the Tokaj wine region, winemakers did not reduce prices, did not use price promotions or price promotions, and saw the entry into the online space and new commercial channels as a way of mitigating the crisis caused by the epidemic.

Conclusions

The negative economic impact of the coronavirus has also been felt by wineries in the Northern Hungary region. The questionnaire survey revealed that the Tokaj wine region was the most affected by the economic crisis caused by the coronavirus.

All of the wineries' sales channels showed a decline, but only the Horeca market fell in full in each wine region. The Tokaj wine region had the highest exposure to exports in the study area, and thus suffered the greatest loss of sales due to the pandemic. All the wineries surveyed had direct winery sales, but most wineries entered the online marketplace during the epidemic to protect their sales. All the respondents are linked to tourism, which was the sector most affected by the negative impact of the coronavirus, with all wineries offering wine tastings, which declined 100% during the first wave of the epidemic. The wineries with accommodation and restaurants have closed temporarily as a result of forced closures and government decisions, but none of the respondents have lost any of their employees.

More than half of the wineries would have liked to take advantage of the government subsidies announced, but only 3 wineries met the criteria. Most of the wineries using the subsidies made use of the green harvest subsidy, mostly in the Bükk and Tokaj wine regions.

The high euro exchange rate affected the purchase of bottling equipment. All wineries import equipment from abroad (Slovakia, Italy). Wineries that had export activities during this period were least affected and compensated for the surplus in expenditure.

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AGRICULTURAL SECTION

Food waste reduction initiatives in Romania

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Abstract

Food waste prevention and reduction to a minimum acceptable level is a global goal, being of utmost importance that every country contributes to this endeavour as much as possible. As established by United Nations, through SDG12, Target 3, we should strive to reduce to half the global food waste at the retail and consumer levels by 2030, and reduce food losses along initial stages of the chain (production and supply). The Sustainable Development Goals Report 2020 shows that unfortunately, we as global community are not on track of achieving this goal. In order to assess the situation of Romania, we analysed the initiatives of legislative bodies, companies, NGOs and individuals, to prevent and reduce the level of food waste. The most promising initiatives are registered at NGOs and big retailers, while the legislative initiatives lack a holistic approach of the issue.

Keywords

food waste, surplus products, initiatives, legislation, NGOs

Introduction

The global food security is unquestionably linked with the level of food waste, which also directly impacts the quality of environmental governance. Not only that, but food waste directly impacts the economy of a country and has a hidden social impact.

Some of the most intensive campaigns of reducing food waste are, at global level, organised by Food and Agriculture Organization of the United Nations (FAO). Their effort is strongly connected with the United Nations' Sustainable Development Goals (SDGs), especially SDG12, Target 12.3- "By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses", which is under the 'custody' of FAO. In 2011, FAO together with Messe Düsseldorf launched the "SAVE FOOD – Global Initiative on Food Loss and Waste Reduction".

European Union (EU) tackles the issue of food waste through food safety policies, developing numerous strategies to avoid food waste by optimising the food chain or by redirecting unavoidable waste in a transformation process, to be reintegrated in the food chain as nutrients.

Part of the European Union, Romania has to adopt the legislation and regulations communicated from the EU, and has to take actions in fighting against food waste in

an integrated manner, to reach the goals established by UN and contribute to the global effort of reducing food waste.

Literature review

Romanian legislative framework

The legislative framework for reducing food waste was adopted in Romania in 2016. It comprises of two legislation: the Law no. 217/2016 on reducing food waste, with subsequent amendments and completions, and Government Decision no. 51/2019 for the approval of the Methodological Norms for the application of Law no. 217/2016. In November 2020, the Law no. 217/2016 was modified by Law no. 131/2020, eliminating the limitation of food donation only to the final consumer. The new legislation expands the sphere of receiving economic operators by including food banks – organizations specialized in food transfer.

Unfortunately, after January 1st 2019, when the Law entered into force, it was discovered that it is quite inefficient. The law regulates the activity of big commercial chains, where only 7% of the total food waste is registered, but not the households, that are responsible for 49% of the waste derived from food.

In 2020, the Romanian parliament issued a new legislation: Law no. 181 from August 19th 2020 on the management of compostable non-hazardous waste. The aim of the new law is to reduce the quantity of waste that ends in the landfills, by separately collecting the biowaste and biodegradable waste from gardens and parks, food waste from household kitchens, offices, canteens, restaurants, wholesale, catering and retail stores and similar waste from food processing units. By collecting this waste separately and using it to create compost or biogas, it can be ensured that at least some part of the food value is retained and returned, even when the food products leave the human consumption circuit.

Food waste level in Romania

According to the 2021 Report of United Nations Environment Programme (UNEP), the level of household food waste in Romania is situated at 70kg/ capita/year, for a total of 1 353 077 tonnes/year. The European mean value for household food waste is 72 kg/capita/year, with the highest levels registered in the southern Europe (mean value 90 kg/capita/year). Greece is ranking the highest regarding household food waste, with 142 kg/capita/year, the lowest level being registered in Slovenia, 33kg/capita/year in 2019 and 34 kg/capita/year in 2020.

According to a study by Ministry of Agriculture and Rural Development (MARD), regarding national food waste, the highest level of food waste is discarded by households – 49% of the total food waste, food industry follows swift with 37%, 7% of food waste is coming from retailers, 5% from public food services and 2% from the agricultural sector.

The most mentioned reason for throwing food are spoilage 26% of the quantity, wrong estimation of the amount of food consumed at a meal, resulting in 21% of food waste and excess shopping for 14% of food wasted.

Leftovers are thrown away the most, representing 26% of the total food waste, followed by bread and pastry with 21%, vegetables with 19% and fruit with 16%. The remaining

18% are distributed between meat and meat products, milk and dairy, oils and fats.

Material and methods

To identify food waste reduction initiatives in Romania we first turned our attention to official websites and information pages from the Ministry of Agriculture and Rural Development (MARD), the National Veterinary and Food Safety Authority (ANSVSA), the National Center for Health Assessment and Promotion, and the National Association for Consumer Protection and Promotion of Programs and Strategies in Romania (InfoCons). All of them represents official entities in Romania and all have dedicated section for food industry and food waste data and prevention.

By consulting and analysing the materials available on their websites, as studies and information materials from various projects, we were able to identify numerous initiatives tackling food waste, in various stages of occurrence and in different approaches related to food waste.

Results

As with any other waste, food waste can be managed with specific tools, respecting the waste hierarchy. According to the organisation Zero Waste Europe, as stated in their policy briefing from 2019- "Food Systems: a recipe for food waste prevention", because food waste has specific characteristics and differs from other types of waste, they recommend the defining of a specific waste hierarchy for food waste, that should represent a guideline for all the parts of the food sector, from producer to the final consumer.

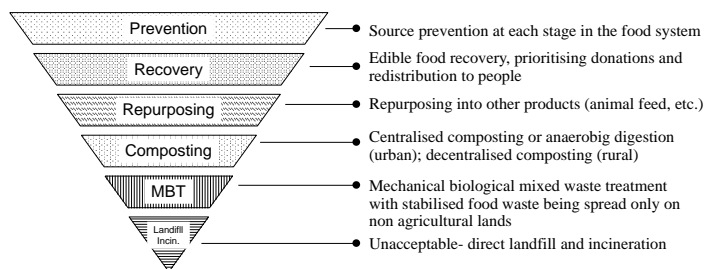


Figure 1. Food Waste Hierarchy

source: Food Systems: a 'recipe' for food waste prevention

According to official studies, from MADR (Ministry of Agriculture and Rural Development) in collaboration with InfoCons (the National Association for Consumer Protection and Promotion of Programs and Strategies in Romania), published in 2017, the main cause of food waste is rapid degradation (26%) and incorrect estimation of the amount needed for a meal (21%). Romanian households most often throw in the bin leftovers (25%).

As distribution on the food chain, the highest level of waste is registered at the final consumer, which produces around 49% of the total food waste. Food industry contributes with 37% to the total amount of food waste, while the retail sector contributes with 7%, catering and restaurants with 5% and agricultural sector with 2%.

Table 1. Contribution to food waste per sector of food chain

Sector	Contribution to Food Waste (%)
Agricultural	2
Catering and restaurants	5
Retail	7
Food industry	37
Households	49

Source: authors' interpretation of data from MADR

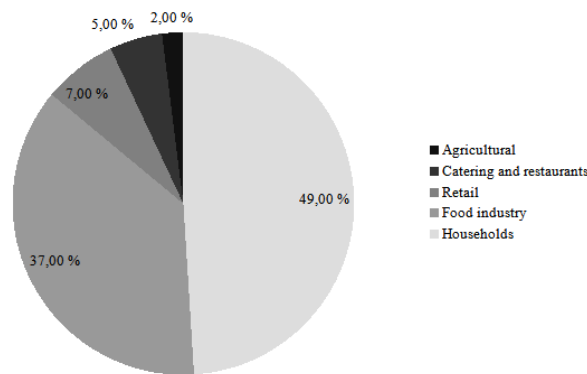


Figure 2. Contribution to food waste per sector of food chain
source: authors' interpretation of data from MADR

After researching the available data sets from the aforementioned sources, we discovered that the initiatives to reduce the occurrence of food waste in Romania are oriented in two main directions:

- the retail sector
- the household and final consumer.

The retail sector

The main initiatives to reduce food waste originated at retail level are the Law no. 217/2016 on reducing food waste, with subsequent amendments and completions, and Government Decision no. 51/2019 for the approval of the Methodological Norms for the application of Law no. 217/2016. These legislative acts intend to provide guidelines to the economic operators, for selling the foods that are within recommended consumption period but are close to the expiry date of the minimum durability with a discount and with a clear mention on the label of the expiry date. Also, the law regulates the transfer of food destined for human consumption but close to the expiry date of the minimum durability, by donation, to recipient operators. The food products that can be donated must be in the last 10 days of validity, exception being highly perishable food products (unpasteurized vegetable and fruit juices, pre-cut vegetables and fruits, germinated seeds). Also, the law specifies that for the food products that are donated, therefore not sold for profit, the economic entity benefits from tax facilities, as the transferred food is considered to be the subject of a manual gift.

As a result, after the entry into force of the Law no. 217/2016, the food retailer Lidl Discount Ltd. (owned by Schwartz Group) in partnership with Food Bank Collection and Distribution Association, started the founding of food banks on Romania. The first one is Bucharest Food Collection and Distribution Bank, inaugurated in the same year, followed by food banks in Cluj, Roman, Braşov and Oradea. Today, the network has 9 food banks, covering all Romanian territory. The network of partners extended over time, being currently composed of almost 30 donating partners. Among them are large retailers (Metro, Selgros Cash&Carry, Kaufland), food industry representatives (Unilever, Nestle, Kellog's) and also local or national food producers or distributors (Albalact, Frufu). Since the inauguration, Food Bank Collection and Distribution Association, collected and distributed more than 1,500 tonnes of food from their partners to the recipients.

The consumer/household level

Most of the initiative oriented towards the final consumer and households preoccupy themselves with the education aspect of food waste. The initiative are most often coming from non-profit organizations and are promoting a change of perception and behaviour in the final consumer.

Food Waste Combat (FWC). Started in 2012, in Cluj-Napoca, FWC concentrated their efforts towards educating the local community about food waste and how it can be avoided. In 2015 they launched a book, "Food Waste- analysis and possible solutions", in partnership with Junior Chamber International – JCI Cluj, that received numerous awards, including TEDxEroilor Audience Award. In 2017 they started a series of workshops on food waste in schools and private companies, offering solutions on reducing or avoiding food waste. In the same year, Lidl Discount Ltd. became their partner and together they launched the first food bank in Romania and later a nationwide network of food banks.

Mai mult verde (approximate translation- *Greener*). Greener is an NGO founded in 2008, with a focus on environmental problems and how to address them efficiently. In 2017, together with Lidl Discount Ltd., they started a project for combating food waste- "Romania against food waste". The project materialised with the founding of Food Waste Romania and the platform dedicated to facilitate the access of consumers and retailers to solutions for surplus food or opportunities for volunteering in the fight against food waste

Food Waste Romania (FWR) is a project developed by Greener and Lidl Discount Ltd., that provides final consumers with informations regarding food waste, methods of reduction and prevention, video materials about correct storage, meal and portions planning, smart shopping solutions and creative use of leftovers. They also provide a catalogue of organizations in Romania involved in waste prevention and use of food surplus. In October 2018, together with Lidl, they organised the Anti-waste Caravan, travelling trough 7 cities and organising workshops on food waste prevention and reduction in schools.

InfoCons is an NGO founded in 2003, in order to protect the interests of consumers. In 2017, under the coordination of Lithuanian Consumer Institute (LCI) and in partnership with other consumers associations from East European countries, they launched the project "Respect for food!". The project had a duration of 3 years, and had as main objective increasing the degree of education and informing consumers about food waste.

Conclusions

Some of the earliest associations and organisations that started the fight against food waste are mainly local initiatives. Trough local partnerships between producers or retailers and the aforementioned associations, food products that would have been otherwise discarded reached the local community that needed them.

The national endeavours to prevent and reduce food waste started, most of them, after 2010, with major impact after 2015-2016. By partnering with big retailers, the national NGO developed educational programs and social actions to reduce food waste and to redirect food products rejected from selling to the communities. After

analysing the impact of aforementioned associations, we concluded that the highest impact was produced by the associations Food Waste Combat and InfoCons.

The legislative framework on food waste reduction is unfortunately not effective enough. As stated before, it concentrates the attention to the retail sector, that only produces 7% of the total amount of food waste in Romania, but there is no legislation addressing the final consumer and food industry, generating together 86% of the total amount of food waste. The Compost Law introduces the framework for the recovery of value from biodegradable waste, including food waste, but does not contribute in any way to the reduction of food waste generated through the food chain. Therefore, for the Romanian consumer, it is still legal to generate huge amounts of food waste, as long as it is recovered through compost.

Summary

Food waste is an extremely hot topic in the context of environmental responsibility and sustainable production and consumption based on sustainable use of available resources. Considering the great impact of food waste on the quality of the environment, being the third largest emitter of GHG on Earth, we considered necessary to analyse and evaluate the initiatives to reduce food waste at national level.

By analysing the legislation, the framework for application and the reaction of the food sector to the legislation, we concluded that it has many shortcomings, the first being concentrating the attention to only one element of the food chain (retailers), neglecting the issues found on the other elements (consumers, food industry, etc.).

The most successful social initiatives to reduce food waste are the projects of Food Waste Combat and InfoCons. They created intensive educational campaigns, with national coverage, targeted mainly at the final consumer, but engaging in their efforts big retailers activating in Romania (Lidl, Kaufland, Metro, Selgros Cash&Carry) and also representatives of the food industry (Nestle, Unilever, etc.). Due to the efforts of Food Waste Combat, the first national network of food banks was created.

The most active retailers in the fight against food waste are Selgros Cash&Carry, Metro, Lidl Discount Ltd., Kaufland Romania and Carrefour Romania Co. - in redirecting food products to the community through social projects and food banks, and creating educational campaigns for the final consumers, regarding solutions for food waste reduction.

The fight against food waste is by far not over yet in Romania, the level of waste being still high, but we consider that by active and constant community involvement, correlated with functional legislation and with the implications of all the actors of the food chain, this issue can be successfully addressed and food waste can be reduced to a minimum.

Acknowledgement

We declare that we are not in any way associated with any of the NGOs presented in the paper, nor we received any monetary or other type of recompensation for including them in the present paper. We do not advertise for any of the organisations aforementioned in the text of the present work. We simply presented the facts as they are, regarding initiatives to prevent and reduce food waste on the territory of Romania.

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Yearly Vegetation indices Trend representation of the Kosovan agricultural land in cloud computing from remote sensing data imageries

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Abstract

This poster is a short analysis of the current situation of agriculture in Kosovo regarding climate change from an analysis of vegetation indices. The four vegetation indices calculated with Sentinel 2, Landsat 8 and MODIS demonstrate the potential, problems, and gaps of using remote sensing over land management in Kosovo. Temporal changes over Kosovo factorise the changes of climate change in rainfed agricultural production in Kosovo. Real assessment of vegetation indices (VI) for the time series we investigated those changes from NDVI, NDMI, NDWI and GNDVI. Analysis was carried out from pixel-based for yearly overview analysis on the current data collection dataset in Kosovo. The normalised difference vegetation index was correlated by the reported yield of wheat on the region for the years 2021, 2020 and 2019 respectively r^2 (0.61, 0.70, 0.44). Satellite data can provide supplementary data for analysis, but a lack of local data is needed for validation for the regional and country level. Cadastral data and cropping historical data integration in cloud computing to support the calculation of VI crop field management in small scale and fragmented farming is the best approach in case fragmented parcels with multiple remote satellite imageries.

Keywords

Kosovo, vegetation indices, crop management, time-series, yield

Introduction

Agricultural activities keep one of the main shares in the total brute product of Kosovo although it is very scattered within sectors. The Republic of Kosovo has relatively a small territory of 10908 km² (KERA, 2020) from and only 1.1 million hectares it uses around 420209 ha for agricultural activities, a land cover of over 44% of forested areas and only 38% of agricultural land and around 17% of urban areas.

Kosovo has very mixed land uses measured from surveys and land cover analysis, an applied crop rotation application, land conversion, settlements are mixed concentration and spread alongside roads, including urban scattering lacking development plans. Valleys are surrounded by mountains with complex relief with rich habitat, high biological biodiversity and few and small lakes and rivers and small size agricultural plots. The quality of land and soil classification has high implications for agriculture influencing the production in-field productivity.

The soil composition is very diversified with rapid changes. Soil traits are dependent on the eroded material sedimentation at that place with forested areas state-owned and private which are prone to deforestation and burning, leaving behind degraded lands. With it, even the agricultural land is converted to urban or industrial areas. The degraded lands and soils are unable to retain rainwater as consequence it is flooding and increased pollution. Soil and agro-management influence practices changes influence on projected changes has shown moderate-income increase when crop diversity increased.

A significant loss in production is to be seen in the coming years based on the production of these crops if not taken into consideration melioration practices. Significant declines are emphasised on the yield of each crop, and it is estimated that more than 50% of agricultural production is consumed within households whilst food remains a high proportion of total household expenditure 60% small share for trading (ARCOTRASS, 2006). Although farmers have shifted from the conventional farming of cereals to more diverse in fruits and vegetables for their field and as perennials to the shift from rainfed agriculture may be foreseen if investments increase in the irrigation system.

The need for general research on Kosovo agriculture is important to determine which parameters and vegetation indices can be correlated with the agricultural consensus/surveys and bring a better outcome for agriculture smallholdings and agricultural land small-scale farming and cultivation.

Agricultural activities provide a small portion of Gross Domestic Product (GDP) for 7.7% in 2019 and 7.4% shares in 2020 compared to previous years. Its contribution to GDP has decreased year by year compared to the highest which was in 2008 at 11.3% (KAS, 2020a) a factor showing economic development in other sectors.

Mediterranean climate is favourable at the current state for production but the levels of development in urban and agricultural needs for water put the country at menace. Especially, the current climatic trends of hotter summer and wetter and warmer winters with possible flooding during the winter and spring. Kosovo's water storage is underdeveloped, and the combination of limited renewable water resources will make Kosovo very vulnerable to climate change variability (Bank, 2018). Having no river flows except Iber and no storage, any eventual drought is visible as the ones in the past in 1993, 2000, 2007, 2008 and 2014 are intimidating. The total five storage dams are about 539 million m³ or 300 m³ per person compared to regionals of 799 m³ on average.

The study was to determine and see whether the agricultural induced changes are visible from the vegetation indices (VI) calculation and provide inside about agricultural production in Kosovo.

Literature review

The agricultural area which is used for land cultivation is 188 371 ha, from which 51% or 217102 ha is used for pastures and meadows and 44.8% or 188371 ha is agricultural land. Kosovo has a large area distribution used for the cultivation of cereals out of a total of 66.2% followed by pastures of 19.9% and vegetables of 4.8% (KAS 2020-AEB).

From the total agricultural land, only 32009 ha are irrigated where only 46025 ha can be irrigated from the potential irrigation systems (ASK, 2021) whereas around 80% of agriculture production in Kosovo is rainfed and low intensity.

Cereals and fodder field crops account for the largest cultivated land in Kosovo up to 90%, whereas fruit and vegetables up to 9.5 with a slight improvement in production and yields are observed but not constant in years (Consortium, 2006) wherein 2019 have been reported the highest value of output (MAFRD, 2020a) up to 14%.

Improvements in agriculture and working with it come from a decision in all models: low profitability, lack of equipment, lack of manpower, lack of input, other reasons. Other reasons: crop rotation, lack of security, yield, labour cannot be considered a highly significant factor behind the decisions to leave land fallow (Sauer et al., 2009) although detectable.

Climatic change and drought can be defined as a period of abnormally dry weather, persistent to produce a serious ecological, agricultural, or hydrological concern. A projecting of climate change indicates warming and drying in the Mediterranean Basin, intensification of climate extremes (Mrabet et al., 2020). And since 2004, 80% of Kosovo municipalities have suffered from water shortages due to hydrological drought, misuse of water resources, ecosystem degradation, increase and new forms of pollution and water-related diseases (Bank, 2018). Kosovo a country with a lack of river flow during the summer, which is rainfed, can cause an issue when realising the agricultural plans for irrigation and other parameters and in one another part dividing the water reservoirs as drinking water.

The very fragmented structure of farmland on average in Kosovo is about 3.9 ha and these farms are typically fragmented onto more plots (Davies et al., 2018). Processing and trading companies are contracting smallholders, collecting small bulks of production to supply the domestic market, also exporting. Field size is one of the factors affecting agricultural production and development, reasoning from 61% of agricultural holdings own smallholdings up to 5 ha and 38.8% have over 5 ha and with more than 2 parcels (Ramadani & Bytyqi, 2018) (Kotschi, 2013)(Fastelli et al., 2018). This excludes a priori the production of bulk products such as cereals or oil crops. Few products can be produced that are cropped on small acreages decreasing the economic efficiency of farming and bringing low competition with neighbouring

countries. Pushing farmers from land use for agriculture to other sectors or abandoned cultivation due to poor soil quality high prices of agricultural inputs (Kamberi, 2009)(Commission, 2021).

Smallholdings in Kosovo are mostly semi-subsistence oriented, and their commercial production is small. Therefore, they produce a little surplus for the market sales (MAFRD, 2020b). This calls for a system of contract production in cooperation with processing and trade companies, such is existed and needs to be improved. Capacity building of producer associations and technical training of their farmers are important aspects (Kotschi, 2013).

Environmental research proprieties based on future potential: energy resources in climate change, consequences of climate change on biodiversity and molecular tools in nature conservation (Halili et al., 2009) where numerous forests have been classified as centres of flora, fauna and ecosystem thus being classified as potential areas for the Ecologic Network, Nature 2000" (Mustafa et al., 2011) protecting from overexploitation of coal and minerals and release pollutants (Kabashi et al., 2011). Preserving the flora and vegetation of Kosovo with the floristic elements from the Mediterranean, Europe, and Asia. Important habitats are being damaged and degraded, and ecosystems are being destabilized because of human intervention, particularly in the ecosystems near settlements because of absent urban planning. Recently, because of indiscriminate wood-cutting and fires, various species and unexplored faced the danger of losing their habitat and incoming invasive species which change the floristic structure of the ecosystem (Millaku et al., 2013).

The main hydrological feature in Kosovo is an unequal and inadequate distribution of water resources concerning demanding sectors. The water-energy potential in Kosovo is very low and it has been used until now to a very modest extent (MESP & AMMK, 2015).

The current level of water demands the country has reached the boundary of replenishing resources at the state of distribution infrastructure. The OSCE also observed that Kosovo municipalities are not adequately prepared to tackle water shortages. Especially rural areas do not have access to running water but are dependent on wells and springs with questionable water quality" (OSCE & UNMIK, 2008). The approximate inland water of Kosovo has a share of 0.41% of the total area (Strasser & Stec, 2020) furthermore extreme heat occurrences nowadays are 100 times more likely to occur than centuries ago (Eckstein et al., 2020) which will put the country on unfavourable condition in near future.

Measures considered to increase efficiency in each water use sector: develop new water-supply networks, construction agriculture irrigation systems, new accumulation dams and expand current irrigation systems in more regions (Government of the Republic of Kosovo, 2016). The Iber Canal itself has various damage, despite repairs of large leaks, it is susceptible to damage from landslides, leaks and pollution (Engineering, n.d.) whereas the Radoniqi-Dukagjini irrigation system is modern and

can irrigate 13600 ha and the main crops grown under the Radoniqi irrigation scheme are vegetables, corn and fodder crops (ARPD, 2019). Water quality was measured for the Dukagjin basin by (Rizani & Ibraliu, 2016) in the summer, the results can be considered of very good quality for irrigation.

Time series analysis over a region could be an element for effective management of pastures and meadows (Erdenesaikhan, 2003) as for Kosovo the same methodology could be used to determine when a pasture or a meadow is productive or could be decreasing it.

Measurement of water runoff and evapotranspiration (Hatfield, 2015) for water management at a field level bring benefits to the farmer but the use of remote sensing data (Demelezi et al., 2019) to calculate evapotranspiration on a large scale utilises the resources at a much higher scale (Maselli et al., 2020) (Gandhi et al., 2015).

Material and methods

Spectral vegetation indices calculation over the years proves to be a tool to define the time series change over a region of interest or at the field level. The study region is Kosovo, and the pixel-based analysis was taken in the region of Anamorava. Fields that were visible for analysis are cultivated in years. The soil is clay loamy and is relatively flat, close to a narrow river.

The vegetation indices calculation for pixel-based analysis were done over these coordinates (21.32215, 42.34467). It represents an agricultural field cultivated with cereals and vegetables in rotation bordered by pastures. It has a Continental-Mediterranean climate affected by the decrease of rainy days in the summer, they could last from the end of May to the end of August. The reasoning of this research is to analyse the agricultural area of Kosovo in cloud computing by using google earth engine for some vegetation indices for the entire territory of Kosovo for urban, grassland, agricultural land forested areas. Below is shown the flow chart of the methodology and the vegetation indices used for calculation with the spectral bands.

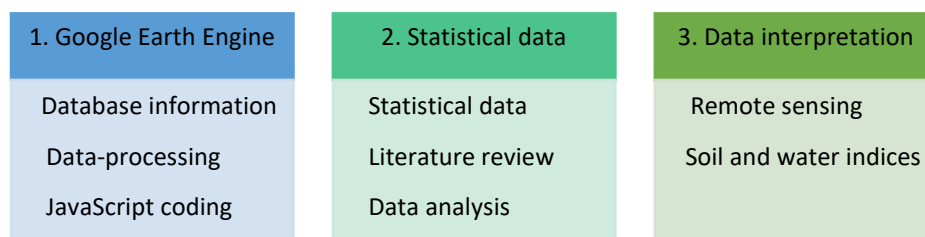


Chart 1. Flow-work methodology

$$NDVI_{sentinel\ 2} = \frac{(NIR_{B8} - RED_{B4})}{(NIR_{B8} + RED_{B4})} \quad (\text{Casa et al., 2018})$$

$$NDWI_{sentinel\ 2} = \frac{(Green_{B3} - NIR_{B8})}{(Green_{B3} + NIR_{B8})} \quad (\text{Bhangale et al., 2020})$$

$$GNDVI_{sentinel\ 2} = \frac{(NIR_{B8} - Green_{B3})}{(NIR_{B8} + Green_{B3})} \quad (\text{Sankaran et al., 2018})$$

$$NDMI_{sentinel\ 2} = \frac{(NIR_{B8} - SWIR_{B11})}{(NIR_{B8} + SWIR_{B11})} \quad (\text{Lastovicka et al., 2020})$$

Chart. 2. Vegetation indices formulas

Results

Literature review and statistical data gave the first impression on small scale farming of fields 2 ha up to 5 ha representing up to 35% of the total area of arable land in Kosovo (MAFRD, 2020a). Looking at the effects of climate change and the projects given for an increase in temperature in the coming years, most of the farmers' crops is projected, resulting in a decrease in yield production. Whereas the warmer and shorter winters will decrease the amounts of water onto the soils and so on the rain-fed crops will reduce the yield and those that were possibly irrigated will require to increase the irrigation amount per month.

As seen below in figure 1, the rainfall distribution over the years the project foresees that an increase in rainfall amount in the coming years for Kosovo. The spatial distribution from the data gathered has changed where the relief of Kosovo affects the rainfall and spatial distribution. An interesting pattern in the yearly average can be seen where one year receives more rainfall than previous. It is expected that the forests will receive more rainfall or rainy days than where the agricultural lands are.

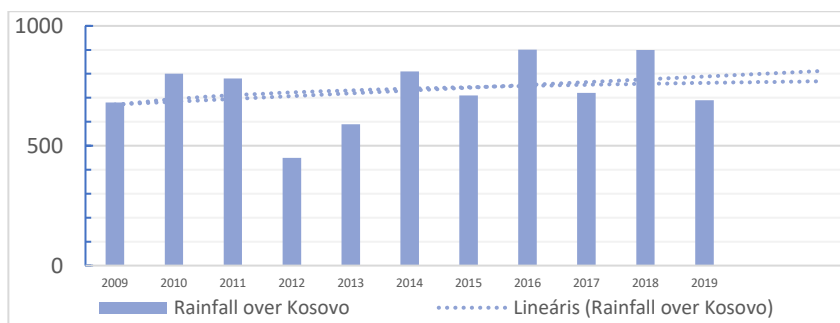


Figure 1. Rainfall over Kosovo

On average it has a precipitation of 650 mm annually and with 690 mm for the year 2019 (KAS, 2020b) with significant snowfall low temperatures in the winter and.

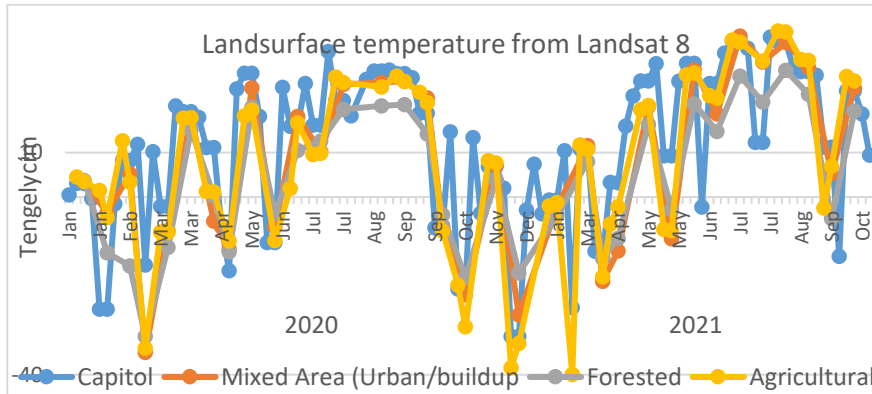


Figure 2. Land surface temperature measurement from Landsat 8 on GEE

Meteorological systems in Kosovo need improving and providing relevant data for analysis on agricultural parameters lacking to meet its requirements. In the region of Kosovo where this study has been focused the closest meteorological data provided were scattered data for many years. The maximum and minimum temperatures were 6.3 °C and 16.7 °C respectively and the median was 15.9°C (AMMK, 2016). To generate more recent data, we have used Landsat 8 imageries to calculate relevant data for the entire area of the country. The analysis for 4 different selected areas with polygons showed interesting data and brought an average for the land surface temperature (LST) of 10.9 °C for the capital city, 8.58°C for mixed urban and built-up areas, 5.61°C for forested areas and 8.83°C for agricultural areas as in figure 3b the standard error was high. From figure 2 where land surface temperature is visible the results repeat right data for the time. Considering the extremes in (fig 3b) in winter they do not present real data measured and reported (AMMK, 2016) for recent years.

Kosovo has an elevation of a minimum of 265m and a maximum of 2656m at Mount Gjeravica with about 80% of the entire area below 1.000m and an average of area distribution around 560 masl.

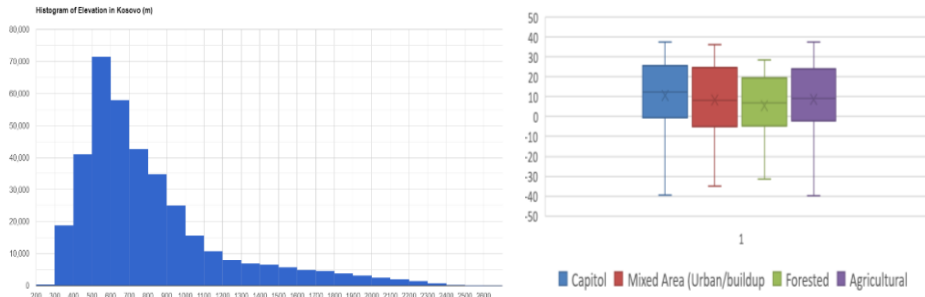


Figure 3. (a) Elevation frequency of Republic of Kosovo (b) Land surface temperature

Forested areas occupy a large portion of the land area in Kosovo approximately is 44.7 as seen in figure 4 that their distribution is thorough of the country.

In the larger part of Kosovo’s plains and adjacent hilly areas, climate and soils are suitable for agricultural land to use the measurement done in GEE using the satellite land survey for Kosovo was accurate by reaching a minimum of 200 and a maximum of 2600, the importance of this is that each of these areas does provide with a resolution of 30 meters or 1-arc second as in histogram below with about 80 % of the entire area below 1.000 m. As seen in figure 4 the spatial distribution of elevation is quite mixed, forested areas cover the boundaries and the valleys are long and narrow, making two main Agri-regions.

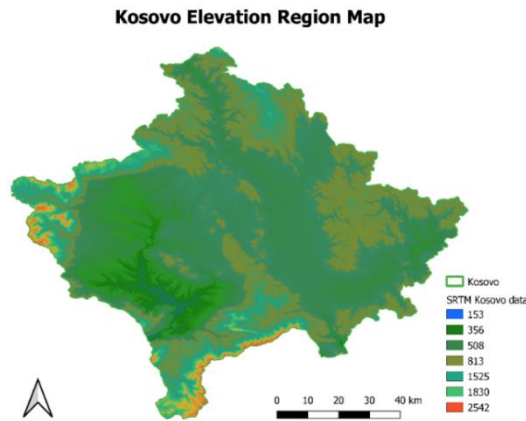


Figure 4. Spatial distribution of elevation over Kosovo from NASA SRTM 30m

The vegetation indices (VI) were calculated for obsolete values, and they represent correct results for the timing. NDVI as a parameter is well correlated with the ongoing photosynthetic process during the whole vegetation. NDVI ranges from -1 to +1, the close values to 1 the greener the pixel or healthier the plants whereas closer to

0 and -1 respectively they represent open waters, bare soil, build-up area etc. Higher values ranging 0.5-0.7 were distributed over the southwest part of the country for July as in figure 7, where dominate forest cover areas. NDVI 0.3- 0.49 values are mainly distributed in forest fringe areas extending from north to east of the country. In addition, based on the surveys of the KAS the declining rural population and rural to urban migration result in a change in many aspects of agricultural production, labour need and forestry expansion.

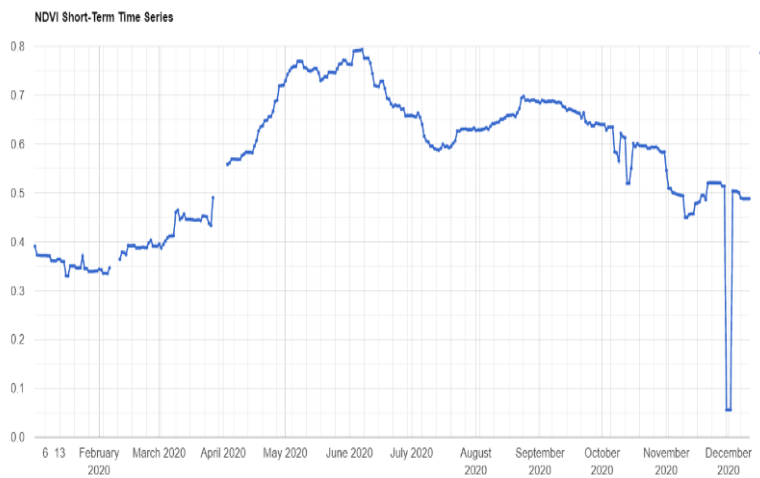


Figure 5. NDVI yearly time-series (pixel-based) MODIS

Figures 5, 6 are analysed the satellite imageries respectively Modis and Sentinel 2.

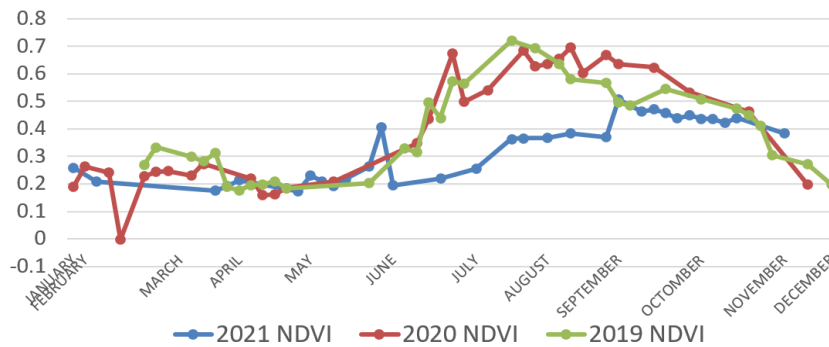


Figure 6. NDVI yearly time-series (pixel-based) S2_SR

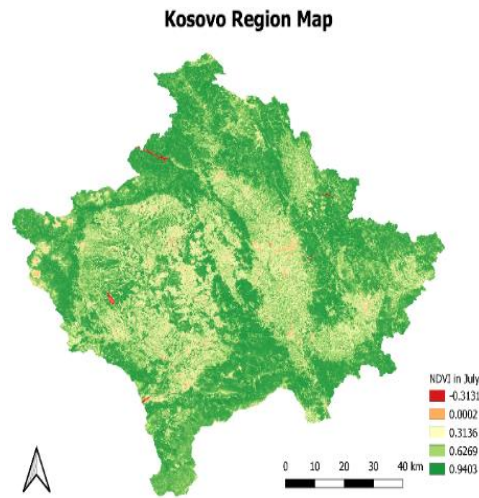


Figure 7. NDVI yearly time-series (pixel-based) S2_SR

The NDVI values pixel-based varies from 0 to 0.7, the lowest was measured in February where over Kosovo is expected to be covered with snow, a right spatial representation of NDVI values is seen in figure 7 in July, middle of the vegetation period and the hottest month of the year, the red pixels represent the lakes in Kosovo. The R² for the yield reported for the year 2021 R² = 0.61, 2020 R² = 0.70 and 2019 R² = 0.44. The yield is measured considering the green biomass production of wheat (MAFRD, n.d.) measured at the flowering and yield formation. The highest yield correlation was reached at the 3 t/ha. Considering the wheat is seeded around the of October in Kosovo, depending on climate too it requires 1500 to 2900 degree growing days and water is needed at the flowering stage, around May. Green visible plant is sprung covering the soil before snowfall of December (dormant period) and harvested in June.

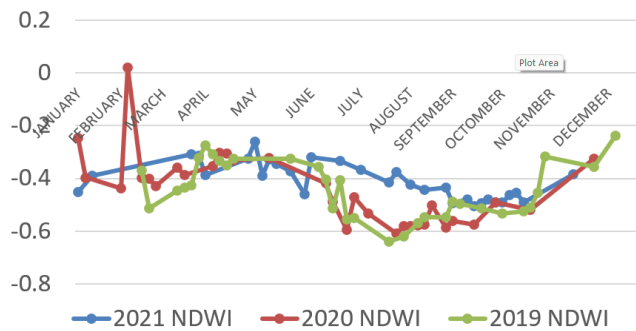


Figure 8. NDWI yearly time-series (pixel-based) S2_SR

The normalised difference water index (NDWI) provides information about the drought caused stress and the band calculation is less affected by the atmospheric disruptions. It varies from -1 to 1 where the case of figure 9 from the time series analysis we can determine that the specific crop during the summer is displaying signs of lack of water during the vegetation period for at least 60 days, maximum yield capacity cannot be reached.

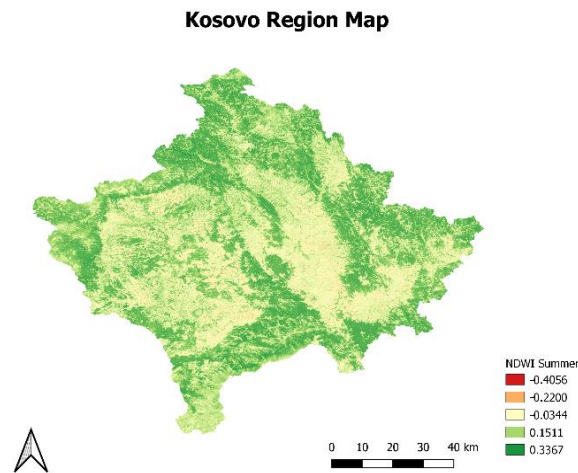


Figure 9. NDWI yearly time-series (pixel-based) S2_SR

From the results and spatial distribution, we can conclude that most agricultural production fields in Kosovo during the summer are water-stressed crops and to reach the full yield potential they should be irrigated. Whereas forested areas are greenish, the valleys where agricultural production and farming is continuous it is masked in light green. An approach should be taken to correlate NDWI time series with crop maturity if soil water availability is constant after certain crop growing days.

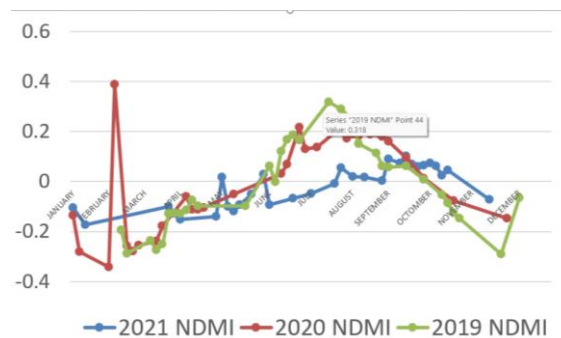


Figure 10. NDMI yearly time-series (pixel-based) S2_SR

NDMI is a normalised difference moisture index, and it can reach from -1.00 to 1, is can relatively precisely determine the moisture content in the mixed vegetation cover of the soil. A value of 1-0.8 represents no water stress(waterlogged), 0.8 to 0.6 high canopy cover and no water stress and 0.2 to 0.4 a high water-stressed, average canopy or low water stress. In the figure, 10 results represent the measured moisture index from the pixel-based, the high value achieved in February is from the cloud cover over the pixel at the time showing the fact that the cloud can interfere with the results and outcome. Summer high-value results of 0.25 represent land cover that is under cultivation or man-made surfaces. Considering that the pixel where researched is found over wheat surfaces and the land surface temperatures as in figure 2 present the vegetation in a high or average canopy of low water stress as prolonged rainfall would last causing plants to wilt evidently.

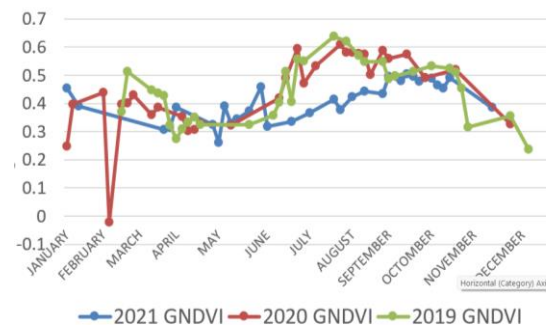


Figure 11. GNDVI yearly time-series (pixel-based) S2_SR

The GNDVI (Green normalised difference vegetation index) is more sensitive to changes in chlorophyll content than NDVI because it uses the green band to measure the chlorophyll content as direct photosynthetic activity of the vegetation cover. The figure above shows the constant increase from May to July and constant values till the crop harvesting assuming the water availability for the crops during the whole vegetation period (Hunt et al., 2008).

In the table below we have displayed the total results of these analyses of each vegetation indices. For NDVI, NDMI, NDWI and GNDVI we had on average 31 imageries for analysis respectively for 2020 and 2021 and for the year 2019 we had 33 imageries analysed with a cloud probability on average of 10%. Cloud cover for analysis was selected less than 10% because the results of cloud masking and data errors in output are more filtrated and accurate.

Collected satellite imageries support analysis in retrospective and defined based on the outcome the best timing and performance indicator and promote the best agricultural practices.

Table 1. Data results in extraction from Sentinel 2 imageries

Year	NDVI			NDWI			NDMI			GNDVI		
	2021	2020	2019	2021	2020	2019	2021	2020	2019	2021	2020	2019
Jan-02	0.259	0.189		-0.453	-0.247		-0.105	-0.135		0.453	0.247	
Jan-07		0.264			-0.397			-0.28			0.397	
Jan-12	0.208			-0.39			-0.172			0.39		
Feb-01		0.241			-0.439			-0.342			0.439	
Feb-06		-0.003			0.021			0.388			-0.021	
Feb-11									-0.194			
Feb-16		0.227	0.27		-0.398	-0.371		-0.258	-0.287		0.398	0.371
Feb-21		0.245	0.333		-0.402	-0.514		-0.278			0.402	0.514
Feb-26		0.247			-0.43			-0.254			0.43	
Mar-07									-0.236			
Mar-12		0.231	0.299		-0.36	-0.447		-0.238	-0.274		0.36	0.447
Mar-17		0.273	0.282		-0.386	-0.436		-0.177	-0.25		0.386	0.436
Mar-22	0.175		0.313	-0.308		-0.427	-0.101		-0.128	0.308		0.427
Mar-27	0.193		0.189	-0.314		-0.323	-0.129		-0.125	0.314		0.323
Apr-01	0.214		0.175	-0.386		-0.274	-0.151		-0.129	0.386		0.274
Apr-06		0.219	0.196		-0.354	-0.309		-0.059	-0.115		0.354	0.309
Apr-11		0.16	0.197		-0.303	-0.333		-0.112	-0.075		0.303	0.333
Apr-11		0.163	0.21		-0.306	-0.351		-0.112	-0.098		0.306	0.351
Apr-16		0.185	0.183		-0.33	-0.324		-0.105			0.33	0.324
Apr-26	0.173			-0.325			-0.139			0.325		
May-01	0.231			-0.26			0.018			0.26		
May-06	0.21			-0.391			-0.099			0.391		
May-11	0.192	0.208		-0.329	-0.323		-0.12	-0.051		0.329	0.323	
May-13	0.218			-0.345			-0.093			0.345		
May-16									-0.097			
May-21	0.264		0.204	-0.373		-0.325	-0.051			0.373		0.325
May-31	0.406			-0.459			0.03			0.459		
Jun-02	0.195			-0.319			-0.092		0.063	0.319		
Jun-05			0.329			-0.357			-0.001			0.357
Jun-10		0.349	0.315		-0.419	-0.404		0.032	0.12		0.419	0.404
Jun-15		0.436	0.497		-0.489	-0.514		0.07	0.168		0.489	0.514
Jun-20	0.219		0.44	-0.335		-0.406	-0.068		0.187	0.335		0.406
Jun-25		0.674	0.573		-0.595	-0.557		0.218	0.165		0.595	0.557
Jun-30		0.499	0.564		-0.472	-0.55		0.13			0.472	0.55
Jul-05	0.254			-0.367			-0.048			0.367		
Jul-10		0.541			-0.532			0.138			0.532	
Jul-20									0.318			
Jul-22	0.363		0.721	-0.415		-0.639	-0.008			0.415		0.639
Jul-25	0.366	0.685		-0.377	-0.61		0.054	0.217	0.289	0.377	0.61	
Jul-30		0.627	0.692		-0.581	-0.621		0.172			0.581	0.621
Aug-04	0.367	0.636		-0.423	-0.581		0.02	0.189	0.246	0.423	0.581	
Aug-14		0.654	0.637		-0.577	-0.571		0.183	0.151		0.577	0.571
Aug-19	0.384	0.696	0.581	-0.444	-0.575	-0.548	0.017	0.226		0.444	0.575	0.548
Aug-24		0.604			-0.503			0.19			0.503	
Aug-26									0.114			
Aug-29	0.369	0.668	0.566	-0.434	-0.587	-0.548	0.004	0.179	0.061	0.434	0.587	0.548
Sep-03	0.507	0.635	0.495	-0.495	-0.56	-0.488	0.091	0.16	0.058	0.495	0.56	0.488
Sep-08			0.486			-0.497						0.497
Sep-10	0.463			-0.481			0.074			0.481		
Sep-13	0.472	0.623		-0.505	-0.574		0.101	0.096	0.061	0.505	0.574	
Sep-18	0.458		0.546	-0.495		-0.513	0.068			0.495		0.513
Sep-23	0.438			-0.479			0.06			0.479		
Sep-28	0.45	0.533		-0.491	-0.491		0.065	0.012	0.009	0.491	0.491	
Oct-03	0.437		0.508	-0.49		-0.532	0.074			0.49		0.532
Oct-08	0.435			-0.464			0.061			0.464		
Oct-13	0.422			-0.455			0.024		-0.052	0.455		
Oct-18	0.44		0.475	-0.491		-0.524	0.045		-0.085	0.491		0.524
Oct-23		0.464	0.451		-0.519	-0.511		-0.077	-0.127		0.519	0.511
Oct-28			0.412			-0.455			-0.148			0.455
Oct-30			0.305			-0.316						0.316
Nov-09	0.384			-0.385			-0.072			0.385		
Nov-19									-0.291			
Nov-22		0.197	0.271		-0.326	-0.356		-0.148	-0.065		0.326	0.356
Nov-27												
Dec-07			0.197			-0.237						0.237

Conclusions

A low spatial resolution but high temporal resolution, MODIS data are useful to track changes for regional or large-scale landscape over time because of the time spent to make an earth full imagery and the spatial resolution. Whereas Sentinel 2 temporal revisit is within 10 days, Landsat 8 an 18-day repeat cycle. Although they provide better spatial resolution, respectively 10, 20 and 60m for S2, Modis 250m and Landsat 8 has 30m. These applications are the monitoring of vegetation health, growth from time-series analyses, long term land cover changes, snow cover trends, water inundation, forest, and urban expansion. For our study there were selected 31 satellite imageries for 2020 and 2021, whereas for 2019 were 33, images were filtered with less than 10% cloud cover.

Early detection of crop water stress can prevent many of the negative impacts on crops, respectively yield. From RS and UAV real-time data of land and using the NDWI index, agronomists can monitor irrigation, crop stresses, risk of fires in near-real-time, thus significantly improving agriculture efficiency as we could define these parameters from this research paper. Land surface temperature in four different regions showed radical changes in the polygonal area because of the numerous pixels they contained. Mentioning that urban pixel showed higher variation in results and seen in figure 3b, where furthermore calibration and validation to be taken to consideration for better accuracy.

NDVI is a measure of the state of plant health-based on our research the values stay above 0.35 during the summer period but a comparison with NDMI and LST, we could detect crop stresses on continuous vegetation period. As chlorophyll strongly absorbs visible light and is detected by the satellite sensors a piece of significant information for the crop vegetation health are obtained. NDVI results from MODIS and Sentinel 2 interconnect on NDVI values since they were elevated and diminished concurrently at the same pixel location. In our study, the NDVI values in 2020 pixel based varied from 0 to 0.7 middle of the vegetation period and the hottest month of the year.

Pixel-based gives advantages to analysis if carried out in flat areas and with monocultures, which are shallow soils slopes and soils, low permeability, and a large contributing area (De Alwis et al., 2007) which in our case they resulted from the NDWI index that during the vegetation period they were dry areas within a land cover type situated on a steep slope, deep soils, a high permeability. Signs of lack of water during the vegetation period for at least 60 days.

NDMI is a normalised difference moisture index, and it can reach from -1.00 to 1, it can precisely determine the moisture content in the mixed vegetation achieved in February is from the cloud cover over the pixel at the time demonstrating the fact that cloud can confuse the results and outcome. Summer high results of 0.25 represent land cover which is under cultivation or manmade surface, results that we

should provide more coding in each parameter in analysis for a better outcome in the trend indices.

The GNDVI is sensitive to changes in chlorophyll content than NDVI because it uses the green band to measure the chlorophyll and display the current measured state. The pixel-based analysis presents point data and by analysing different places outcome is a different result which is important to reduce the marginal error of results.

Important for further time series analysis in the crop monitoring for the region is having urban planning and cadastral boundaries mapping with historical metadata to get insights and better crop management on each field.

Summary

One main objective in this study was to provide reliable estimations of agricultural activities through the vegetation indices. Remote sensing analysis in a local computer is storage and time consuming because of terrain and satellite orbits passing over the same location. To map full imagery with one satellite pass using sentinel 2 or Landsat is not possible because of their orbits and cloud cover which creating a time series analysis requires further processing as reprojections, cloud masking, mosaicking, brightness, and corrections.

Agriculture in Kosovo should follow up fast progress in crop cultivation, soil assessment, land protection and technological improvements in machinery and support farmers with information for weather, soil and irrigation system support and planning. Although the conditions and resources farmers have the production should be improved to meet the food demand.

Concerning the use of satellite data for the surface of Kosovo the data only collected from satellite, imageries don't provide sufficient information to be relied on because of issues and land parcellation. Water resources are scarce in summer for vegetation requirements and buildings of dams as water storage, new irrigations systems are the best way to approach these issues in a sustainable and secure hereafter.

For this, we have chosen cloud computing and open-source coding in JavaScript-based in our need, where no further pre-processing is needed by only combining with high spatial and temporal remote sensing data. Our objective was to develop a generic simple workflow model of high spatial and temporal remote sensing data without the need for in situ analysis. Data availability and publication of databases in Kosovo are scarce regarding weather data, regional yield and per land area.

Vegetation indices analysed (NDVI, NDWI, NDMI, GNDVI) produced correct data for the pixel-based analysis and data correlation and comparison brought the desired results for the temporal land surface analysis. The time series analysis produced rich information for wheat production during 2020, but for different crop monitoring and having real forecasting for crop management would require mixing the

information from different satellite receivers with different spatial resolution, in-situ soil, and soil moisture real-time and from meteorological data into one spatial and temporal resolution. Although VI measured and the trends were useful to provide cultivation information for Kosovo.

Cadastral and cropping historical data integration in cloud computing supports crop field management in small scale and fragmented farming.

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Developing rural reality through simple food industries

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Abstract

With the beginning of the crisis in Syria and the departure of much of the area of the Syrian Arab Republic from the state's control, the agricultural sector was affected very badly, not to mention the fires that severely hit the Syrian coast and the western and central regions, and most of the lands producing one of the strategic crops, olives, were damaged, as the area destroyed by the fires was estimated A square kilometer of Syrian territory, according to United Nations reports, the disaster led to the burning of more than three million olive trees.

Hence, it is necessary to think of a way to compensate for this loss, especially since the reconstruction of olive trees and their ability to give back is not less than seven years.

So we need a relatively quick alternative capable of solving the agricultural problem, and the alternative is to plant citrus and seasonal fruit trees, where citrus trees such as lemons and oranges complete their full growth and production within a period not exceeding three years.

But the real problem here is that most of this production is exposed to damage due to the high costs of transportation and packaging to be sold, hence the idea of establishing mobile or miniature and scattered factories to produce juices and possible natural products from planted trees, which in turn achieves an additional return for farmers in addition to the investor, thus encouraging the Spinning the wheel of production and even exporting and achieving additional returns for all.

The idea is not new in general, as there were efforts to establish a large juice factory in 2015, but the conflict in ministerial decisions hampered the project, which has not seen the light until today. The ability to implement it is limited, and the establishment of one factory will not solve the transportation problem, while if separate factories are established in small sizes and gradually to reach the appropriate number, this will be much easier, and the gradual success of the factories will be a strong catalyst for horizontal and vertical expansion, and many local investors can implement the project without Introducing external investors on the line.

Keywords:

Project, project management, Juices, citrus, developing

Introduction

Agriculture in Syria constitutes 17.94% of the gross domestic product, with an arable area of 6070 thousand hectares, the total invested area of which is 5724.1 thousand hectares, and about 17% of the total labor force works in the agricultural sector, or nearly 900 thousand workers.

Agricultural activity in Syria is considered one of the most important productive activities, especially after 1980, when the area of irrigated lands increased thanks to large agricultural projects, the use of modern agricultural machines and the increase in government interest in agriculture, infrastructure development and attention to

water resources, where the contribution of this sector is estimated between 25-30% of Gross Domestic Production.

The agricultural sector plays an important role in the Syrian national economy, as agricultural exports contribute an important share in foreign trade and provide foreign currencies. The agricultural sector also provides a lot of raw materials for various other economic and industrial sectors. In addition, it contributes to employing manpower and providing a livelihood for large numbers of individuals (50% of the population works directly or indirectly in 1980). The agricultural sector ranks second after oil in terms of export revenues in the balance of Syrian exports, and during the past recent decades (Before internal conflicts and wars) agriculture was able to cover the needs resulting from the population increase at a rate of four times, which improved the degree of self-sufficiency of the bulk of the main foodstuffs and encouraged traditional exports such as cotton in addition to entering new export markets such as wheat, vegetables and fruits.

The agricultural activity is practiced by the public sector (government farms) and the private sector (investors and families), in addition to the joint sector (investors + government agencies), where the percentage of cultivated land by the public sector in 2019 was approximately 1%, and the private sector was an area of 3203 thousand hectares, and the common sector 2520 thousand hectares.

Literature review

Based on the previous information that was mentioned in the previous section, the idea of research came to establish juice production factories based on citrus trees and fruit trees, especially since they are a latent wealth and are not properly invested with the neglect of the public and private sectors to this point, as farmers have complained during many previous years of damage A large part of the crops as a result of the futility of harvesting and transporting them, noting that the manufacture of 100% natural juices does not need much additional work when compared with jams factories.

The manufacture can take several forms, fixed or mobile, different sizes as needed, automatic and semi-automatic.

Project definition

What is a juice production plant?

It is a factory with easy-to-use machines and does not require experienced labor to use the machines that make up it. With the damage to olive production and consequently, a large number of mills are out of use, it must be highlighted that those mills, with simple modifications, are able to transform into factories for the production of natural juice and from local production. We are here. There is no need to establish factories from scratch, but only by making some modifications to the olive presses. With time, and in the event that the burned areas that were previously planted with

olives are replaced by citrus plants, it is possible to establish factories for the production of seasonal juices for export or local consumption, which will provide a feasible return that compensates for more than what was previously. It is offered by the olive season once a year to become a year-round return.

The importance of the project to establish a plant for the production of natural juices:

Naturally manufactured products are by far the best for human consumption, according to nutritionists and health officials.

They are considered as important components of our daily diet due to their properties as rich sources of nutrients and their wonderful aid in digestion in the human body.

The whole idea of producing natural fruit juice came as a result of the excessive availability and selling of a lot of chemical based drinks in the local market which have some dangerous effects on our health.

Given the chemical composition of the majority of different beverage brands on the market, they can be seen as poorly assuming that they are major causes of increased incidences of diseases such as diabetes, cancers and a host of others.

As for natural juices, they are easy to digest, and can be consumed by any age group. Hence the idea of making natural juices, which is one of the ideas of successful factories that many people benefit from, whether it is for medical solutions or its inclusion in the daily routine, and this is what makes the investment in that project successful. Significantly and significantly, the equipment used by it is relatively cheap than any other project equipment.

Project problem

This project has some problems and the most important of them will be mentioned, noting that some of them will have been overcome, especially after the recent fires:

- The rigid mentality of farmers, especially olive trees: As most of them found their parents and grandparents planting olives throughout the ages, which made it difficult to convince them to change the trees of their lands, but with their loss in fires and with adequate awareness and explanation and convincing them of the feasibility of changing the types of trees, it will be possible to switch to planting seasonal trees, especially since the period for this is much less than the period needed by trees Olives for regrowth and tenderness.
- The obstacles that companies producing industrial juice can put in the face of natural juice factories, as the products of these companies will not be as good as the quality and even the cost that will be provided by the natural juice factories, as there is no need to import any dyes, colorings or preservatives, as everything will be Natural and the only addition would be sugar compared to the chemicals that make up artificial juice.

- Previously, the state neglected the production of citrus as a result of its lack of prospects for optimally investing this product, but now the state needs such a product, which, with appropriate support, can become a strategic product.
- The absence of natural juice factories previously, but now with a little light on this production, juice production may become a factor of attraction for many investors, thus financing them to build juice factories or modify the idle olive presses for an unknown period.
- The natural juice industry did not give this industry the appropriate importance in the past, but now, with the state's direction to reconstruct the agricultural sector, concepts and orientations will differ.

Material and methods

Project Objective

The project aims to invest in the local production of fruit trees, in order to spread juice production factories and bring about a qualitative change in agricultural production.

The goal of establishing such projects is to produce juices using simple technologies within the reach of young people with the use of quality and safety standards for the product to come up with a product free of any pollutants, of high quality and low costs to achieve good profitability for young investors and at the same time develop the local market

The main objectives of the project are:

- Production of natural products without artificial additives
- Introducing the concept of complementary industrialization for agricultural production and added value
- Employing more manpower, some of which are relatively experienced
- Creating small projects in an actual, sustainable and long-term sense
- Transformation into medium-sized projects with the passage of time and the entry of more necessary specializations such as marketing.

Project Definition

Scope of the project (Scope Management)

Brief description of the required plant: The factory is a building with an area of not less than 500 square meters that contains a washing machine, squeezing and filling machine, and a place for storage. It is characterized by:

- The factory operates on a daily basis according to the period required for squeezing the input materials, except in cases of emergency maintenance and development.
- The system works with electrical energy as the main power source.

- In the future, other energy sources such as solar and wind energy can be used at certain times, but this depends on the size of the project's success and returns and the feasibility of that development.
- The average life of the machines is 10 years, where it is possible in case of feasibility to replace the machines with more modern ones as needed.
- Initially, the operation is done personally, with the possibility of automating the project in the event of future expansion and an increase in project size and production.

Project charter

The summary of project:

- Title: A project to establish a factory for the production of natural juices from locally grown fruit trees and from relatively nearby places.
- Project manager: Mr.....
- Customer name: The owner of one of the agricultural lands producing fruitful crops or an investor wishing to establish the factory
- Project start and end date: 01/01/2021 to 06/30/2021
- Project duration: 6 months

The concerned:

- The commercial owner (the owner of the land and the crop): He is concerned that the factory has a reasonable cost, production capacity and conforms to the specifications and standards required for food production.
- Operation team (workers): concerned with making the factory easy to use and maintain, in addition to its application of safety and security standards.
- The contractor: He is concerned that the factory and its operation are practical and able to start production.
- Final consumers: They are concerned that the product is healthy, good and has an advantage over competing industrial products.
- Owners of cultivated lands: they are interested in purchasing their crops on an ongoing basis at reasonable prices.

Need and goals:

- The machines operate entirely on electric power, meaning that the production is environmentally friendly
- It is possible to work in the laboratory continuously and according to the ability of the machines to remain in operation
- Providing storage spaces for raw fruits and processed juices
- Restore the possibility of expanding the production line and increasing the number of machines

- Project description: A building in the shape of a hangar with an area of 500 square meters. It contains a production line, an administration room, a rest room and a storage place.

Project limitations:

- Feasibility studies with detailed plans for the factory are to be completed within a month and a half.
- The necessary licenses for construction should be completed by the end of the third month.
- To receive the machines in the middle of the fifth month.
- The factory should be delivered with production readiness within a maximum period of 6 months.
- The factory's ability to expand, update parts of the production line or replace.

Main hypotheses:

- The maximum area of the production line does not initially exceed 350 square meters.
- The machines that make up the production line should be available and easy to maintain and replace.
- The work of the machines is not affected by the variation in the usual atmospheric temperatures in the place of construction of the plant.

Project Scope

- Project budget: 500-520 million Syrian pounds, applying an exchange rate of 2500 to one dollar
- Project size: Hangar-shaped building with an area of 500 square meters
- The degree of risk: The production lines are generally similar for this size of the projects, and the risks of development and disruption can be overcome by choosing a production line with parts that can be replaced with newer ones, if needed.
- The outputs of the project: A one-story building that contains a production line for natural juices, with inputs of fruits in their complete form, all the way to containers of different sizes of natural juice.
- Project Description: A single-storey building with an area of 500 m² divided into a designated area as follows:
 - The production line is 350 meters
 - Two rooms for administration and rest with a total of 50 meters
 - Storage section with an area of 100 meters.
- Requirements: The construction of this juice processing plant requires a set of partial requirements which are:
 - Electric feeding system.
 - Storage system.
 - Air conditioning system.
 - Lighting system.
 - Water system and treatment.

All of them require management and coordination among them so that the necessary equipment is prepared and does not disrupt the work or not be fully invested.

Stages of work

Before starting the work division structure, the main tasks and works needed to implement the project must be mentioned, as some of them overlap over time, and the main works are as follows:

1. Feasibility study and planning (a month and a half)
2. Issuing the necessary licenses and approvals for the project (a month and a half)
3. Studying the suppliers of the production line and agreeing to supply it (two weeks)
4. Factory site construction (2 months)
5. Production line shipment and customs clearance (two weeks)
6. Create, download and install the production line (week)
7. Purchase of necessary furniture and office equipment (two weeks)
8. Training and trial operation (two weeks)

Organization Breakdown Structure (OBS)

Project manager (financial manager), feasibility study office, project supervisor, Purchasing Officer, construction engineer, Electrical Engineer, Network Engineer, Project attorney, construction workers (10), painting workers (4), Electricians (2), Installation technicians (4), Pickup and drop workers (4).

Resource estimating:

The final project cost was estimated at 506,430,000 Syrian pounds, and it includes salaries and wages for workers, costs of studies and necessary official transactions, in addition to the materials, machinery and equipment that make up the factory. The following table shows the details of the costs with the total cost for each component.

Project execution and monitoring and control:

- Project monitoring is an on-going process that takes place throughout all phases of the project. The objective of this process is to provide stakeholders with detailed information at an early stage on the progress of project activities approved in the plan.
- The monitoring steps can be summarized as follows:
- Collecting data related to the implementation of project activities and performance indicators and entering them through approved forms and databases.
- Conducting field visits to monitor the implementation of project activities, depending on the monitoring and evaluation plan. In our plan, we rely on a periodic field visit every Sunday of every week.

- Determine the information we need to collect, such as:
- When does each activity start and end.
- Expenses incurred in each activity.
- The number of working hours spent in each activity.
- Determining if what was planned has been accomplished, and on this basis, it is determined if it is possible to move to another activity and task, or if we need modifications.
- Designing questionnaires and forms for monitoring and evaluation purposes.
- Setting indicators for measurement.
- Determining a schedule for the dates of data collection and analysis.
- Assisting in the needs assessment by conducting a field survey during the project design period.
- Drawing graphic curves showing the actual state of the project in terms of its completion and comparing the achieved results with the plan developed to show deviations, whether in time or cost.
- It is important to take preventive measures before deviations occur, and it is not prevented from asking employees about their expectations of problems or delays in the supply of some materials, and it is possible to ask them about new proposals that will facilitate work and maximize achievement.
- Establish corrective measures for deviation, if any, after knowing the results of the work and collecting data, in the event that the change in the plan takes place in time and implementation consumes more than the work days planned for each activity. The actual project cost, with attention to the need to budget with the total estimated cost of the project and the unit of activity, in the event of an increase in the actual cost of the activity compared to the plan depends on reducing unnecessary expenses
- Issuing interim and final reports for all approved activities and stages and the final assessment of the project results.

Results

Investment Opportunities and General Investment Climate

The Syrian climate in general is considered an attractive investment climate for many investors, especially with the beginning of the easing of the crisis that Syria has been going through for more than nine years, and given the limited supply that the country has witnessed recently compared to the growing demand.

The Syrian market is characterized by a low volume and level of internal industry, as the number of manufacturers is limited compared to the internal demand for goods and services, and production is mainly limited to private enterprises and traditional family workshops, which in turn have a modest production capacity, which creates a gap between demand and supply.

Any industry that aspires to enter the Syrian market has faced and will face many difficulties at all legal, economic, financial and administrative levels, in return for a

promising market that awaits this industry if it manages to overcome or deal with most of the challenges it faces, knowing that the Syrian government has recently worked to support and encourage local industries and provide facilities different to rejuvenate its economy.

The Syrian government is working to secure a suitable environment for incubating economic projects, by providing various facilities, especially for industrial projects, where customs duties in this area were reduced from 20% to 5%, and Decree No. 172 of 2017 reduced customs duties by 50% on raw materials and production inputs. Necessary for local industries to reach 2.5%. Law 19 of 2017 also exempted imported machines and production lines in favor of licensed industrial establishments from customs duties and other fees resulting from import.

Table 1. The volume of production (estimated in tons) in the western region (Lattakia and Tartous) for the year 2019 of fruit trees related to the research

Lemon	Orange	Tangerine	Indian Lemon
150552	701228	189793	44260

Ministry of Agriculture 2019

Table 1. The cost of production for this category of trees, according to what was prevalent in 2019

Production Cost Average for Citrus Trees		
nature cost	Item	Unit : S.P/Ha
1-Agriculture Operation	Ploughing	45000
	Weeding	45000
	Trough	40000
	Growing& Pruning& Wood Collection	52798
	Irrigation Costs	97202
	Chemical Controlling	40000
	Organic Fertilizer	33601
	Chemical Fertilizer	36399
	Harvesting	118858
	Sorting& Packing	39619
	Loading& Unloading	5590
	Crops Transportation	68940

	Guarding	15000
	Total	638007
2-Production Requirements	Organic Fertilizer Value	70000
	Chemical Fertilizer Value	323509
	Containers Value	261049
	Chemical Control Value	70000
	Water Value	62273
	Other	25000
	Total	811831
	3- 9.5% of interest capital	71208
	4- 5% incidental expenses	40591
	5- costs/year of study	123642
	6-total costs (1+2+3+4+5)	1685279
	7- 15% of prod. land rent	301482
	8-total costs (6+7)	1986761
	9- average yield (5 years) kg/ha	27915
	10- Kg. costs/ Syrian pound	71.2

Conclusions

After completing the project, we document each of the stages, record all the lessons learned from the project, and approach the project with other projects that have the same activities.

A good and successful project starts from the good design of its plan and the development of most of the possible scenarios taking into account the risks, in addition to the financial plan and the optimal use of the available resources, whether financial, human, tools and equipment, etc., which gives a great vision and a comprehensive picture of the project and facilitates its management and shows the role of each individual in it Until getting to close it.

Then we can compare the plan and implementation on the ground, evaluate the project in all its aspects, and the measures that have been taken throughout the life of the project and make sure to learn from previous projects and develop communication and organizational skills to reach the best management and optimal planning.

In this study, the importance of project management and its ability to plan in a relatively small local project has been highlighted, which may make a qualitative leap in the economic reality of the country if it finds the appropriate incubator to adopt it.

Summary

This research is presenting a brief study of a solution proposal to improve the reality of the producers of families in the western region of Syria, in particular for the production of citrus and fruit trees, in order to achieve an appropriate return that encourages farmers to continue their work in addition to improving their living conditions tangibly, as the number of families working in the cultivation of the product is estimated between 60 to 70 thousands family in Syria.

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Agriculture and the Climate change

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Abstract

This paper investigates the question of climate change. Does it exist in the nearby areas of my hometown? Is there actual proof concerning the phenomenon or is it just an excuse of human negligence? After providing background information about the subject I seek to provide proof about its actual, valid existence in the area with the help of local farmers through interviews and records going back 20 years. After showcasing the gathered evidence, that proves my thesis correct, the effects of climate change are real and noticeable I'd highlight what types of actions the farmers performed or tried to do to minimise or mitigate the damage caused by this change before I finish this paper.

Keywords

Agriculture, climate change, global warming, glasshouse effect, drought, flood, temperature, modernisation, irrigation

Introduction

Nowadays, the debate about the reality of global climate change is a regularly renewed topic with increasingly convincing arguments that it is a process that humanity must take seriously. A series of scientific researches are proving that the planet's climate is becoming more extreme, that the Earth is warming, and that the water and atmosphere are changing. This is evidenced by the fact that, from an economic point of view, the famous Stern Review (Stern 2006) already considers this factor to be the biggest risk in the world economy, and estimates that the damage caused by climate change could reach 20% of global GDP. Climate change is also having an increasing impact on the crop and livestock sectors. Climate change has different effects on different sectors. For some sectors, the impact is minimal (eg closed systems, mushroom farms), but it is certain that crops grown on arable land and livestock sectors in more informal farming (preferably in their natural habitat) are the most vulnerable parts of agriculture. The more the grower relies on external climatic factors, the more the farmer is affected by the negative effects of global warming. In view of the above mentioned information, my article set the following goals:

- whether the farmers surveyed are actually aware of the effects of climate change
- if so, which aspects of climate change directly and indirectly affect the farms on the land of the deer and the surrounding area,
- whether these factors have led to a real change in the weather locally in recent years,

- which are the most exposed agricultural sectors, what technological changes and modernization activities farmers use to alleviate and eliminate the existing problems.

I must also mention regarding this topic, that the International Panel on Climate Change/IPCC even issued a „red alert” this summer in their „Sixth Assessment Report, Climate Change 2021: The Physical Science Basis”, because we are nearing the point of no return.

Literature review

Before we explore the results of the research I'd like to talk about the important definitions related to this topic. The terms global warming and climate change are often used interchangeably. However, the two terms do not cover the same thing; global warming is called the global rise in surface temperature due to anthropogenic effects, while climate change also includes global warming and its effects and consequences, such as changes related to precipitation or air movement.

Climate change means lasting and significant change in the climate, locally or globally. This change may include average temperature, average rainfall, or wind. Climate change can also mean changes in climate variability. Changes in a given climate can take place in as little as a few decades. Climate change can occur as a result of natural processes on Earth (e.g., tectonic motion of continents), as a result of external influences on the planet (e.g., changes in the intensity of the sun's radiation), or even as a result of human activity (e.g., greenhouse gas production).

Global warming means a long-term rise in the average temperature of the Earth's climate, which also includes a rise in the temperature of surface waters and the troposphere. It should be added that there were periods of global warming even in pre-historic times, but none of them was as extensive and rapid as the warming observed since the 20th century. The climate is an integral part of an ecosystem - a community of plants, animals and microorganisms; Climate change can change the geographical location of ecosystems, the composition of the species that live in them, and their relationship to each other and to the environment.

Material and methods

I collected the data for my research in Békés county. The county is located in the Southern Great Plain region of Hungary, its seat is Békéscsaba. It has an area of 5631.05 km², 9 districts (Békéscsaba, Békés, Szeghalom, Gyomaendrőd, Szarvas, Orosháza, Mezőkovácsháza, Gyula, Sarkad) in which there are 75 settlements (1 county town and 21 other cities) according to CSO surveys in 2018 about 338025 people live in Békés county with an average population density of 66.8 people / km² (KSH 2013, KSH 2018) Békés county is located in the Great Plain, its area is flat. The plain between the Körös-Maros and the Körös-Berettyó region is almost perfect. The altitude of the county fluctuates around 81-106 meters above sea level.. The area of

the county is covered with a thick layer of sandy-loess sediment. The most significant mineral treasure of the county is natural gas. The continuity of the plain is divided by the relatively dense river network. The county has 8 rivers by number: the Körös (Fehér, Fekete -, Kettős -, Sebes - and Hármas-Körös), Berettyó, Száraz-ér, Hortobágy-Berettyó. (KSH 2013, KSH 2018)

During my data collection, I first had to collect data, to this end I contacted local farmers who met the criteria agreed upon in advance (both small and large scale farmers, young and old) and began to inquire about their willingness to provide data on the following information back 20 years to determine if the data was available. this may be a sign that there has been some change in it's agrotechnics and that this may be due to climate change. The data examined are the species of crop spread on their land, the type of crop, the size of the cultivated area, the method of soil preparation and the method of stock management during sowing, nutrient replenishment, harvest in tonnes / hectare, stubble cultivation and description of cases of force majeure. The farm where the research was conducted is a modern small-scale primary producer farm located next to Nagyszénás (formerly a sole proprietorship, but it ceased to exist in 2020), the land is 100 hectares large and is maintained by a family with the help of occasional auxiliary work. The arable land is located on the border where the clayey loam meadow soils typical of the northern part of the county and the southern chernozem soils meet so the golden crown value of the land fluctuates between about 28-40.

In the second phase of my research, I conducted semi-structured interviews in March 2021. The interviews were also audio-recorded using a dictaphone for later processing. They range in length from 20 to 60 minutes. A literal transcript of the interviews was not made. I based the interview on the methodology described in the book made by Heltai and Tarjáni (Heltai és Tarjáni 1999). The completed interviews were subjected to quantitative evaluation and content analysis based on the methodological suggestions of Babbie (2003) and Newing (2011). The data of the interviews with the farmers concerned are illustrated in Table 1 below.

Surname	Age	Profession
Mihály	77	Primary producer
Pál	67	Primary producer/PFF*
Pál	76	Family maintained Ltd.
Tibor	47	Primary producer/Site manager
Zsombor	41	Family maintained Ltd.

**Primary Family Farm*

Results

Examining the data of the researched farm, it can be seen that the farmer also carried out deep plowing and plowing (initially admitted in an interview that he was only medium deep) and dialing the land for several years. During the interview, I asked about this and said that the first goal was to repair the damage (trampling) caused by the newly procured tanker for applying the basic slurry, but later the changing climate also made it necessary to carry out this work. In addition, the shift in the sowing dates of the crops grown in the last few years is further evidence of the changing weather in the areas. The perception of the phenomenon of climate change by the farmer can be established.

Even if this is not fully perceptible in the text format, the farmers were noticeably proud of their farms during the interviews (body language, emphasis). They felt that they have years of experience, they actually know the lands they cultivate, their economy is important to them. It was noticeable in the interviews, that the most outstanding problems are considered by farmers to be the distribution of precipitation and the capriciousness of the dry, rainy period. Other minor problems (milder winters, increased frequency of inland water) are also causing damage to farms. In addition, it should be noted that three of the five subjects took conscious action to counteract the processes of climate change and two tried but did not have a real opportunity to do so, inhibited by some external human or natural factor (land position in the county, lack of material background, surrounding farmers' negative attitude towards irrigation) in its implementation, but at least in such cases he at least tried to implement them. Furthermore, it is important that for the most part, irrigation, the modernization of farms and the cooperation of farmers working in the surrounding areas were seen as a solution to the problems caused by climate change.

Conclusions

The main goal of my hypothesis was that climate change is real, it can be really perceived by farmers in the area surrounding Szarvas, a real phenomenon, not only a reason without basis for hiding human errors in farms, but also a real problem what is perceived by the interviewees, it causes actual damage to agriculture. My hypothesis was confirmed, the interviews with farmers and the data of the researched farm confirmed that they perceive the phenomenon of climate change in their own production and everyday life. They are also aware of its potential for future catastrophes and to reverse these harmful processes of climate change and prevent further deterioration, the farms actively work (or at least attempt to do so) against the damages with various methods (irrigation, modernisation, etc.).

Summary

The theme of my article is about the effects of the climate change concerning agriculture. For the theme of my article I was looking for the answer whether the effects of climate change are perceptible in the area of my hometown Szarvas and the fields surrounding, whether the farmers working here actually perceive the effects of this phenomenon. Are there actual traces of this on the fields, evidence of a changing climate, does it cause problems for farmers during year-round work, from pre-sowing tasks to harvest work. I sought the help of farmers who met certain criteria. I conducted my research by examining the data of a willing farm, conducted an additional interview, and five in-depth interviews. The in-depth interviews consisted of 1 introductory question and 5 professional questions, ranging in length from 20 to 40 minutes. I examined the data of my research, the results of the investigated farm show that the weather has become more extreme (the crops are shifted due to the amount of excess or excessive lack of precipitation following the drought). The interviews also revealed that all five farmers faced the consequences of the problems caused by climate change (increased volume and frequency of inland waters, milder winters, warmer summers, widening time differences between rainy and dry periods. the five farmers were either actively taking steps or trying, but mainly due to human (surrounding farmers unwilling to cooperate) or economic factors (would require too much financial investment, would not be economical) their work was unsuccessful in eliminating the problems encountered. My hypothesis has been confirmed, farmers perceive the effects of climate change during their own production and everyday life and are actively working to prevent the problems caused by the phenomenon and to reverse the damage present. In the current situation, small farmers, primary producers, who operate on a small plot of land, cannot take advantage of the opportunities provided by developing agriculture. Farmers who are unwilling, not open to new ideas, to apply modern methods, to cooperate with other producers, they cause additional burdens and damage to farmers who support development. Based on the activities raised during the above-mentioned interview and the precision economy (site-specific, GPS-based, IT-assisted crop production system, in which knowledge of spatially changing soil properties and site conditions, adapting to the needs of the cultivated plant, processing and taking into account GIS data, In addition to site-specific agrotechnical interventions required by crops to ensure sustainability, protect the environment and arable land, and be profitable.), farmers have other options to address the challenges posed by a changing climate. Many of the practices typically associated with sustainable agriculture can help increase the resilience of agricultural systems to the effects of climate change, such as diversifying crop rotations, integrating livestock with crop production systems, improving soil quality, minimizing off-farm flows of nutrients and pesticides; cultivation of plants and hybrids that are more resistant to climate, tolerant of extreme climate change. Returning to the other big problem, which, in addition to human factors, is

the main cause of farmers' problems, is the lack of capital to invest. The most appropriate help in this problem is provided by the tenders issued by the state.

Acknowledgement

I'd like to thank my mentor, Rákóczi Attila for supporting me throughout the creation of this article, for helping me consolidating my goals for the future. I'd also like to give my gratitude to the farmers, who made my research possible by providing me with insights into their lands.

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Trends in the evolution of Romanian agriculture

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Abstract

The problems faced by Romania's agriculture since 1990 to date are determined by several interconnected crises: political, economic, fiscal-budgetary, as well as moral and cultural. For more than two decades, given the extremely slow evolution of Romanian agriculture and rural economy, the narrow restructuring of the Romanian agrarian landscape, the persistence of Communist structures and mentalities, stationary or declining technical and economic yields, the lack of exploitation of some huge agricultural areas of the best ecological quality, the deep agri-food deficit, the financial and economic crisis in 2008 in Romania and, last but not least, the current pandemic, the strong economic and financial imbalances are identified by the authors of this article as the main problems faced by rural Romania.

Keywords

agriculture, evolution, problems, agri-food deficit

Introduction

Although agriculture is considered a branch with a decisive role in the restructuring of the national economy, the process of adapting to the new requirements is slow and resulting in economic policy mistakes.

The poor integration of the Romanian rural economy in the market economy because of the preponderance of subsistence agriculture raises a number of political dilemmas in terms of government priorities in the agricultural field.

Restructuring the rural economy has become more difficult after the accession to the E.U., because the financial benefits provided by the CAP to numerous farmers practicing subsistence or semi-subsistence agriculture have strengthened a type of self-consumption-based production, ensuring its short-term viability.

The current structure of agricultural activities does not favour Romania's efforts to fully capitalize on the support of the Common Agricultural Policy (CAP).

The inadequate structure of the farm, of the agricultural holdings is the main factor limiting their competitiveness. Restoring private property of land has been worthwhile to ensure most of the rural population against acute poverty, but has failed to modernize agriculture or create new farm systems capable of producing for trade and be competitive at international level.

Land, labour and capital freely circulate in the extended European Union, and *this phenomenon influences the rural economy, mainly by rapidly increasing their costs.*

In this context, we considered it necessary to analyse the evolution of agriculture in Romania and the effects of the integration process on Romanian farmers.

Literature review

With an important geostrategic position, a significant rural area and a population in rural areas accounting for 45% of the total population of the country, Romania is the second large agricultural producer in Central and Eastern Europe (after Poland). About 60% of the country's territory is used for agricultural production and about 30%, for forestry.

Regarding natural resources, the three-stage layout of Romania's relief – mountains, hills, and plains in equal proportions, in the form of an amphitheatre – results to a diversity of vegetal and animal production that was not at all considered. Fertile soils (1st and 2nd fertility class) representing 26.6% of the arable potential was also a strength of the period.

Another potential factor is that Romania had 40% of Europe's flora and fauna and a forest fund covering more than 26% of the country's territory.

The climate ensures a favourable framework for sustainable agriculture. However, precipitation is not evenly distributed across the territory and correlated with temperature variations, leading to the emergence of moisture-deficient areas in the southern and western country where crop irrigation is required. The productivity of agricultural land has still been diminished by 20-25% of erosion, acidification, salt marshing and excessive drought.

With regard to human resources, it should be recalled that about 45% (over 10,500,000 inhabitants) of the country's population lived, after 1990, in rural areas, and the share of rural population participating in economic activity was over 57%. During that period, migration flows run from the city to the village, increasing the rural population. A comparative advantage of Romanian agriculture is the large number of agricultural specialists with medium and higher education – over 6,000, with one specialist per 500 ha of agricultural land.

A restrictive factor for the sustainable development of agriculture was *the capital*. With aged production capacities, with 75% used tractors and agricultural machinery and a lack of capital markets and agricultural credits (leading to the decapitalization of agricultural farms), it was the strong deficient chapter of Romanian agriculture.

Based on the Law of Land Fund, on Law no. 36 from 1991 on agricultural companies and other forms of association in agriculture, as well as other laws in force (Law no. 15 from 1990, Law no. 31 from 1990), Romania's agriculture has known the following types of agricultural holdings:

- Farmer's households (individual);

- Associative forms of owners and households (family agricultural associations, agricultural societies);
- Agricultural commercial companies;
- Autonomous administrations and agricultural holdings of the public domain;

The predominant were agricultural holdings, especially family ones in comparison with commercial agricultural holdings.

Material and methods

The methodology used in the development of this paper was based on the statistical analysis of primary data, using the quantitative analysis program as a working program.

The statistical data underlying the analysis covered the period 1990-2020 and came from the following sources:

- a) statistical data/information provided by MADR;
- b) statistical data/information provided by EUROSTAT;
- c) statistical data/information provided by the INS (National Institute of Statistics).

Results

The main economic and financial problems faced by Romanian economy, including Romanian farmers, are the dramatic decrease in the liquidity offered by the banks, the increasing decrease of the credits, the emergence of increasing contingents of temporary staff reductions (through technical unemployment), unemployment, drastic diminution of salaries, both in the private and governmental fields and, consequently, the reduction of purchasing power and consumption caused by the increase of energy and food costs, market contraction, decrease in agri-food production and services, sharp decline in state budget revenues because of frequent bankruptcies of SMEs, reduced taxpayers' payments in temporary or definitive insolvency, exaggerated growth in the budget deficit compared to short-term forecasts, fluctuations in national currency, etc.

In addition to all economic phenomena characteristic of the crisis listed above, some chaotic price movements should also be added to two major product categories, energy and food, processes that make us appreciate that *world, European and Romanian markets are managed rather by a speculative hand than by the invisible hand of the economic balance*, as well as by a *particularly precarious state of economic, banking, commercial and, especially, political morality*.

Small subsistence and semi-subsistence holdings have easily incurred the crisis shocks due to more elastic connections with the financial, banking and commercial systems. The effects of the crisis are mainly felt on the yields, performance and internal consumption (food self-consumption) in the sense that they decreased. Most

agricultural products and, to a small extent, the food obtained by subsistence and semi-subsistence holdings “cover” the medium self-consumption of the producers in recent years, i.e., 45-55% of the Romanian food consumption. (Otiman *et al.*, 2011).

Given the precarious situation of the use of the labour force on domestic and European markets, another effect is the increased demographic pressure on small agricultural holdings because of the urban-rural exodus and domestic rural exodus. (*The result is the departure of young people from villages abroad for a place for a place better paid work and leaving villages*). At the same time, a strong effect on subsistence and semi-subsistence households was the diminution of their share (numerical and areal) determined by their transfer (absorption) by big companies, agricultural associations and holdings, by selling and/or leasing of agricultural land by the owners of these types of agricultural holdings (subsistence and semi-subsistence), but also through increasing surface areas of arable land left uncultivated, currently estimated at about 1.500.000-2.000.000 ha, of which 75-80% are found in small agricultural holdings.

Table 1. Evolution of agricultural holdings in Romania (thousands)

Indices	U.M	Total holdings				Physical holdings				Legal holdings			
		2002	2010	2013	2016	2002	2010	2013	2016	2002	2010	2013	2016
Agricultural holdings	mii	4485	3859	3630	3422	4462	3828	3602	3395	23	31	28	26
UAA	mii ha	13931	13056	13006	12503	7709	7450	7271	6926	6222	5856	5785	5576
UAA per holding	ha	3.11	3.45	3.60	3.65	1.73	1.95	2.02	2.04	274.43	190.78	207.49	213.74

Source: After the official website of the Ministry of Agriculture and Rural Development (www.madr.ro)

Note: UAA – used agricultural area

The largest number of individual households have areas up to 1 ha (49.53% of total areas). These small subsistence households have no chances to become viable and, in fact, cannot be classified in any form of economic organization in order to obtain market products, with extremely few exceptions, in the case of vegetables grown in greenhouses. In the analysis and development of agricultural policies, households with up to 1 ha should be excluded from the forms of budget support, in the case of Romania, because of the excessive fragmentation of the land resulting from the application of the Land Fund Law. Families holding and working these areas have ad-

ditional sources of revenue or are urban residents. Romania is one of the E.U. countries with very favourable climate and soil conditions comparable to those of France. Over 40% of the country's area can be used for agriculture in Romania.

According to statistical data, the total area of our country is over 23.839.000. ha, and the *agricultural area shares 61%*, of which 64% is arable land and 33% is pastures and meadows.

Table 2. Structure of land fund according to use

Category	Area (ha)	% of total area	% of total area category	
Total agricultural, of which:	14,590,929	61	100	
Arable	9,352,252	39	64.21	
Orchards and fruit nurseries	196,131	1	1.35	
Meadows	1,553,543	7	10.64	
Grasslands	3,277,656	14	22.37	
Vineyards and viticultural nurseries	211,347	1	1.43	
Total non-agricultural, of which:	9,248,142	39	100	
Roads and railways	388,788	2	4	
Covered by waters	822,703	3	9	
Covered by buildings	737,006	3	8	
Forests and forest vegetation	6,800,872	29	74	
Degraded non-productive land	498,773	2	5	
TOTAL	23,839,071	100		

Source: After MDR

Compared with other EU countries, Romania has important agricultural resources: an agricultural area (in 2017) of 14,630,072 ha, respectively a share of 61.37% of Romania's area.

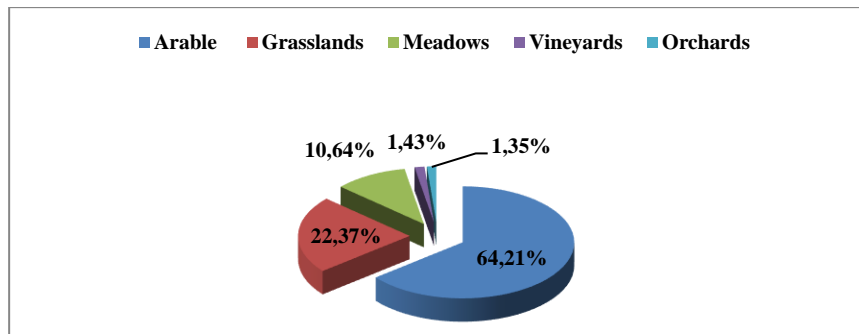


Figure 1 Agricultural area of Romania by category of use
Source: INS – Statistical Roundup – Romania in Figures 2018

According to Figure 1, the distribution of areas by category of use in Romania is as follows: arable land – 64.21%, grasslands – 22.37%, meadows – 10.64%, vineyards – 1.43%, and orchards – 1.35%.

During the transition period, most individual households played mainly a social function. They did not generate production and income for investment and their viability as trading partners was a low one. The family farm was considered a slightly active economic agent, especially towards satisfying self-consumption.

Low productivity, the high share of self-consumption, the advanced age of most owners, as well as their lack of training in the field, explains the practice of subsistence strategies and the lack of concerns for household development.

It is noteworthy that, after three decades of changes in the agriculture of our country, the areas cultivated no longer correspond to those cultivated in 1990, and the largest area is cultivated with cereals (over 62%), according to data published in 2017. The largest share of cereals is that of maize – 46.26%.

We should not ignore that the agricultural production sector in Romania can produce quantities of agri-food product that can cover an important segment of the domestic demand for such products by limiting the import of basic products.

Currently, Romania ranks 6th in area of agricultural land used among the countries of the European Union. It is also a leading world export of wheat and maize (being between the top ten worldwide) and, yet, the productions of Romania do not reach the potential of possible maximum productions.

The productions made in our country depend mostly by unfavourable weather conditions. The dependence of agricultural yields on unfavourable factors annually determines high production fluctuations.

Conclusions

The land reform in Romania has led to a two-pole agrarian structure: on the one hand, individual households of very small size and, on the other hand, large farms with hundreds of thousands of ha.

It is imperative to increase the supply of agricultural products for the market so that Romania can ensure the need for basic products in domestic production, and to reduce imports, too high today, of agri-food products.

In this period of unbalance and economic and financial crisis in Romania, we need an agrarian reform and to start a rural restructuring process in Romania to lead to the development of agriculture and rural areas.

Summary

The problems faced by Romania's agriculture since 1990 to date are determined by several interconnected crises: political, economic, fiscal-budgetary, as well as moral and cultural. For more than two decades, given the extremely slow evolution of Romanian agriculture and rural economy, the narrow restructuring of the Romanian agrarian landscape, the persistence of Communist structures and mentalities, stationary or declining technical and economic yields, the lack of exploitation of some huge agricultural areas of the best ecological quality, the deep agri-food deficit, the financial and economic crisis in 2008 in Romania and, last but not least, the current pandemic, the strong economic and financial imbalances are identified by the authors of this article as the main problems faced by rural Romania.

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Agroecological vocational training curriculum from the perspective of Hungarian stakeholders

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Abstract

Agroecology can be defined as a scientific discipline, agricultural practice, and social movement. Although, the transition towards the application of agroecology requires the availability of financial support and access to educational resources for practitioners at different scales, production types, working in different geographical regions. Currently, most Hungarian farmers lack access to educational opportunities providing knowledge of agroecology-related topics and practices. The Erasmus+ trAEce international project (Agroecological Vocational Training for Farmers, project no 2019-1-HU01_KA202_060895) seeks to alleviate this situation by designing well-elaborated vocational training as well as learning materials for farmers and future trainers. This article introduces the participatory validation process of the developed agroecological vocational training curriculum. Accordingly, participatory research was conducted during two organized focus group meetings in 2020 and 2021. The participants in the validation process were selected using purposive sampling. The results of the meeting highlight the importance of the practice-based teaching approach, the incorporation of participants' individual motivation, and the emphasis on the agroecological holistic approach. Focus group participants also made suggestions concerning the schedule of the training in order to make all training modules attractive to Hungarian farmers. The opinion of the Hungarian focus group members was in line with the proposal of the foreign project partners that the follow-up after the training is absolutely necessary, networking is important not only from a professional point of view but also from the agroecological movement's perspective.

Keywords

agroecology, vocational training, participatory research, focus group discussion, curriculum validation.

Introduction

Agroecology can be defined as a scientific discipline, agricultural practice, and social movement. In the last few years agroecology (AE) is gaining more and more interest as an alternative to modern industrial agriculture. In terms of the expansion of this transition, beyond the availability of financial support for good practice another key factor is increasing access to educational resources for agriculturists at different scales, production types, working in different geographical regions. Currently, most Hungarian farmers lack access to educational opportunities providing knowledge of agroecology related topics and practices. The Erasmus+ trAEce project seeks to alleviate this situation by designing vocational training as well as learning materials for farmers and future trainers. This article introduces the participatory validation

process of the agroecological vocational training curriculum developed in the framework of the trAEce project.

Literature review

According Gliessman (2016), “agroecology is a way of redesigning food systems, from the farm to the table, with a goal of achieving ecological, economic, and social sustainability”. Francis (2004) emphasizes, that since agroecology is an integrative field focusing to the complex agricultural production and food system, the AE education must provide multiple skills and knowledge related e.g., to design and evaluate new systems, as well as to create a future vision and anticipate the impacts of systems.

A shift in the education towards a food system level that acknowledges both the natural environment and society in their complexity, is needed. In order to meet this aim, during the education’s design, it is “increasingly important to link methods from natural and social sciences” (Francis et al., 2003). In agroecological education the importance of integrative and transdisciplinary thinking, experiential and action learning is undisputed (Christophe&Michael, 2018).

The trAEce project (Agroecological Vocational Training for Farmers, project no 2019-1-HU01_KA202_060895) pools together the experience and expertise of 7 differently structured institutions (Diverzitás Alapítvány, Magyar Agrár- és Élettudományi Egyetem (MATE), University of South Bohemia in České Budějovice (USB), Grupo de Acção e Intervenção Ambiental (GAIA), Asociação Agri-Cultura-Natura Transylvaniae Egyesület (ACNT), Landwirtschaft Grand (GRAND Farm)) from 5 European countries (Hungary, Romania, Austria, Czech Republic, Portugal) with a common belief in holistic approach of AE that can be reflected in practice.

In the first phase, the project partners have developed country-specific agroecology situation analyses that also include a summary of the status quo of AE-related training and learning opportunities available at different levels. In Hungary, in the field of higher education, although specific ‘Agroecology’ titled programs, courses or trainings have not yet been developed. However, both BSc and MSc curricula cover several topics related to agroecology (e.g., organic agriculture, soil and resource conservation, environmental management, agrobiodiversity, integrated pest and weed management, landscape management and nature conservation, agro- and soil ecology, natural resource management, agricultural, landscape evaluation and management, environmental sociology, sustainable agriculture, and practices etc.)

Several organisations (12, among others Diverzitás Alapítvány) provide agroecology linked trainings (non-formal adult education) in e.g., shopping community, community supported agriculture (CSA), organic gardening, participatory guarantee systems (PGS), permaculture design, biointensive vegetable production, soil management, mentoring of social farming. There are currently 3 pedagogy programs, namely Tanya (homestead) pedagogy program, School Garden program and

Farm-based education. Besides these, an agricultural producer professional training is also offered. Therefore, the same conclusion can be drawn in terms of traineeships in Hungary – a specific ‘Agroecology’ training is still missing but some trainings on agroecology related topics are available.

The main outcome of the project will be a well-elaborated vocational training in agroecology (e.g., in Hungary and in Portugal there is a lack of such vocational training for farmers). The aim of the vocational training is to enable farmers to satisfy the ecological and social expectations and needs of the 21st century whilst operating their farms in a sustainable way. It will help start-up farmers to design their farm activity and to assist practitioners in order to redesign their farm practice.

The design of the training program for farmers is based on the findings of the above-mentioned situation analysis. The training contains 6 modules (M1-Introduction to AE; M2-Permaculture farm design; M3-Economic strategy and business; M4-AE in action; M5-Added value creation and marketing; M6-Social benefits). Beside the curriculum (already elaborated) other intellectual inputs of the project are/will be learning materials, including user manual and short films. Although the main target group of trAEce is farmers, the project partners are also elaborating a methodological guide (with pedagogical methods and tools for trainers (opinion leader farmers) and educators (teachers of farmers)).

The training is based on innovative education and pedagogies and includes practical tools, which are anchored on the particular nature of Agroecology: participatory approach to learning; learning by doing; peer learning; theory applied to practical situations; multidisciplinary knowledge.

Material and methods

In order to obtain meaningful and truly applicable results for the curriculum and methodology developed, participatory research was conducted through partnerships between researchers and stakeholders; community members, farmers, policy makers, all who present deep knowledge and experience in the field. In addition, to obtain the input and validation from the stakeholders involved in the research, there were organized two focus group meetings (FGM) which included guided round table discussions, and guided open podium discussions. The participants in the validation processes were selected using purposive sampling.

First Focus Group Meeting

The 1st FGM in Hungary was held in Zsámbok (Zsámboki Biokert farm) in August 2020. The 22 diverse participants of this focus group included researchers, organic farmers, university lecturers, representatives of relevant institutions such as the Ministry of Agriculture and members of the trAEce consortium.

The aim of this meeting was to provide feedback on the training curriculum. The method applied during the meeting was guided round table discussion. The partici



Picture 1. First Focus Group Meeting in Zsambok



Picture 2. Second Focus Group Meeting in Jászfényszaru

pants of this FGM received in advance the guiding questions to be discussed. During the meeting the 6 planned modules (content, length) were introduced first. The participants of the focus group meeting made constructive and helpful general recommendations in relation to the training curriculum.

Second Focus Group Meeting

The 2nd FGM in Hungary was held in Jászfényszaru (Szent Erzsébet Községi Ház) in August 2021. The participants of this focus group include 23 researchers, organic farmers, consultants, and members of the trAEce consortium.

The method applied during the focus group meeting was guided open podium discussion where the participants discussed the following topics:

- pedagogical methods adapted to the content of the planned vocational training,
- training days focusing on more important topics of curriculum,
- optimal training schedule,
- selection of perfect training instructors.

The participants of the focus group meeting formulated constructive and applicable recommendations related to the vocational training methodologies, organization (schedule and structure) and also made useful suggestions about possible ideal instructors.

Results

During the two focus group meetings the participants evaluated the content of the modules, the methodologies to be applied, the schedules and delivery proposals. In

order to validate the presented materials, the research team collected their comments and suggestions as follow:

First Focus Group Meeting

Table 1. Results from the round table discussion about the module's content.

Module	Comments/Suggestions
M1. Introduction to agroecology	<p>Basic environmental knowledge required in this module:</p> <ul style="list-style-type: none"> • soil biology • biological plant protection • insecticides • water pollution • genetic bases - seeds and landscape varieties • environmental impacts of the currently used technology • the farm as a complex system • the ecosystem • sustainability <p>If there is no separate module on soil, this can be addressed within this module.</p>
M2. Permaculture farm design	<p>This module could be covered in 3 hours and could focus on 2 main topics:</p> <ol style="list-style-type: none"> 1. The importance of data collection <ul style="list-style-type: none"> • observation - soil, water, climate, biodiversity, landscape • background information, theoretical sources 2. The planning process <ul style="list-style-type: none"> • design workshop - 3 hours lecture • experience sharing 1.5 hours - small group task • question set for the local territory, resources, forums.
M3. Economic strategy and business model	<p>This module could be covered in 1 day, it should include innovations in the field and present examples of good practices.</p>

M4. Agroecology in Action	It should be highlighted that according to the agroecological approach, the mixed economy (crop and livestock production) is ideal. In practice, there are often separate farms engaged in crop and livestock production, so it is important that farmers cooperate with each other.
M5. Added value creation and marketing	Emphasize the importance of CSA (Community Supported Agriculture) in helping to decouple farmers from subsidies.
M6. Social benefits of agroecology	Important topics to be included: <ul style="list-style-type: none"> • farms should be holistic centers of rural life • social relationships, community building • social problems and how to help farmers solve them (good examples)

Second Focus Group Meeting

1. What is the purpose of the training - awareness raising? increase economic viability?

The purpose is to rethink basic concepts working together in an interactive way (map drawing).

The social benefits should be integrated into all modules, ethical aspects that Module 6 addresses could even be mentioned.

It is suggested to have a sequel (professional exchange) after the training.

It is proposed to cover this module in 1 day that includes community (team) building activities; it is also worth dealing with individual motivations; dedicate 1 hour to develop the social aspects content.

2. What is the ideal training duration and schedule for teaching the 6 topics?

Considering the known lack of time for farmers, in the new plan proposed by the project partners, each module is recommended, divided into 5 training days (4 compulsory +1 elective). 4 days of theory from December to February and the practical course during the summer.

3. Which of the practice-focused topics should be covered in more detail in module 4 Agroecology in Action?

Each of them should be mentioned briefly in the theoretical part.

Field crop production:

- emphasis on plant protection techniques: how to solve plant protection without chemicals. What would be the disadvantages if the farmer had used chemicals? (this should be included in the theoretical part).
- grassland management (a neglected topic in Hungary) - the issue of cultivated grasslands, their inclusion in the crop rotation as a weed control.

Marketing issues, not just issues related to selling the product, but other options such as "Take it upon yourself action".

The importance of community building and cooperation of local farmers.

- 4. What are the buzzwords for practitioners and how can they raise awareness of topics that will be part of the training but are not yet at the center of farmers' interest? (e.g., social benefits)?**

"The creative power of farmers" (to capture the positive creative power - if one is driven by an individualist or a desire for power).

"Farmers - Stewards of the Earth's Future" (Spiritual Approach).

"Economic, environmental and social impacts of the chosen farming method." (for rationally thinking people).

"Giving smaller economies a long-term perspective" (large economies are not the target group).

- 5. For each module, participants suggest the ideal trainer (specific person or competencies in general) to be accepted by farmers as a certified trainer.**

The modules should be taught by practical farmers with appropriate presentation skills, as they are the only credible source of practical aspects. Farmers listen to their experienced peers because they think the same way, look at things from the same perspective, and have the same problems and interests.

The instructor should be an open, captivating, authentic personality, a good performer, and a good farmer at the same time.

Conclusions

The agroecological vocational training curriculum for farmers was developed by the trAEce international consortium. Accordingly, the specifics of each project partner country are strongly reflected in the content of the training modules (e.g., dry farming is a topical issue in Portugal, grassland management plays an important role in Romania), but there may also be differences in the structure and timing of the proposed training in the different partner counties. Therefore, in order to offer a successful gap-filling and accessible training for farmers in Hungary, continuous communication and validation with Hungarian stakeholders are necessary. During the project's two focus group meetings organized in Hungary, it was proved that guided

round table discussion and guided open podium discussion as methods are suitable to validate the training content developed with the international consortium and to modify the curriculum (content, structure, duration, schedule) based on the opinions of the focus group members.

Accordingly, the practical aspects are emphasized in the training curriculum, with special attention to soil health and water management as central elements. Based on further suggestion, the introduction of the training (at the first day) contains the mapping of individual motivations and the explanation of the holistic approach that also applies to the exploration of the connections between the modules (e.g., how economic sustainability and marketing plan are related to social benefits). There was another suggestion that the 'social benefits' module should be combined with other modules in the regard of training schedule, since, despite the importance of the topic, it is not yet considered essential by Hungarian farmers. Thus, one-day 'social benefits' module would not be attractive to farmers, however, in combination with other modules, it becomes an integrative part of the training.

The opinion of the Hungarian focus group members is in line with the proposal of the foreign partners that the follow-up after the training is absolutely necessary, networking is important not only from a professional point of view, but also from the agroecological movement's perspective. Finally, Hungarian stakeholders agreed that vocational training, although it should provide theoretical knowledge, should be basically a practice-oriented course applying participatory approach to learning, learning by doing and peer-to-peer learning.

Summary

Agroecology can be defined as a scientific discipline, agricultural practice, and social movement. Although, the transition towards the application of agroecology requires the availability of financial support and access to educational resources for practitioners at different scales, production types, working in different geographical regions. Currently, most Hungarian farmers lack access to educational opportunities providing knowledge of agroecology-related topics and practices. The Erasmus+ trAEce international project (Agroecological Vocational Training for Farmers, project no 2019-1-HU01_KA202_060895) seeks to alleviate this situation by designing well-elaborated vocational training as well as learning materials for farmers and future trainers. This article introduces the participatory validation process of the developed agroecological vocational training curriculum. Accordingly, participatory research was conducted during two organized focus group meetings in 2020 and 2021. The participants in the validation process were selected using purposive sampling. The results of the meeting highlight the importance of the practice-based teaching approach, the incorporation of participants' individual motivation, and the emphasis on the agroecological holistic approach. Focus group participants also

made suggestions concerning the schedule of the training in order to make all training modules attractive to Hungarian farmers. The opinion of the Hungarian focus group members was in line with the proposal of the foreign project partners that the follow-up after the training is absolutely necessary, networking is important not only from a professional point of view but also from the agroecological movement's perspective.

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Reusable new life of polyurethane

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Abstract

Reducing energy consumption is the fastest and most cost-effective way of reducing greenhouse gas emissions and ensuring the security of energy supply. Reducing energy consumption provides great opportunity to increase the competitiveness of industry, to create thousands of jobs, to reduce energy poverty and to increase comfort levels. Polyurethane can contribute to greater energy efficiency by reducing the fossil fuel energy demand of buildings. The light weight of polyurethane combined with its versatility, solidity and durability makes it suitable for controlling noise and interior temperature. It is true that in the production of polyurethane materials a certain amount of energy is used. However, if we compare this to the energy savings generated during their use, the aggregate annual energy savings by far exceed the initial, one-time energy input.

Keywords:

Polyurethane, circular economy, energy security, renewable energy use, smart energy storage, energy regulation, CO₂ emission

Introduction

In line with my doctoral studies, I chose energy security, renewable energy use, smart energy storage and energy regulation as my eligible research area. By 2050, Hungary must be climate-neutral. This was also codified by the Hungarian Parliament. This means that by 2050 we may emit as much greenhouse gases into the environment as the vegetation covering our country can absorb. For this ambitious plan to be implemented, among many other things – but still focusing on my research, I believe that three things are necessary:

1. addressing the problem with locally available materials and tools
2. applying available technology at high level
3. also relying on common sense, by which I mean the use of only as much resources that is absolutely necessary to operate the system. In Hungary, annual CO₂ emissions are approximately 64.000.000 – 65.000.000 tons. The CO₂ absorption capacity of the 25% vegetation coverage is 7.000.000 tons. In connection with the above, I would like to mention two examples: In our country, in the desertifying Kiskunság region – which is one of Hungary's strategic “pantries” – the excess energy from the solar energy system I have in mind is suitable for generating electricity and also for operating a condensation-inducing system, used for drip irrigation system. As a result, even if in small steps, the desertification process could be halted. During my stay

in Israel, I could observe how a subtropical desert in southern Israel was transformed into a green oasis at a much higher cost than by the system I have envisaged. The fact that Israel has only 2% freshwater is not negligible, either. The largest emitter in Hungary is traffic and transport with 15 million tons per year, followed by industry with 14 million tons, residential heating with 12 million tons, agriculture with 9 million tons, energy production with 7 million tons, followed by other sectors with a proportionally decreasing trend.

In this article, I intend to describe the environmental issue directly targeted by an envisioned project within the framework of a relevant plan and strategy. Today, probably the biggest environmental challenge is climate change. Not surprisingly, this has led to a significant increase in the consumption of natural resources, in particular in respect of non-renewable energy resources. During the past 150 years the atmospheric carbon dioxide level has increased from 280ppm to 368ppm according to recent measurements, reaching the critical or even irreversible level. Our insatiable need for fossil fuels, used for the heating and cooling of buildings, contributes to climate change and is generating the domino effect of catastrophes, with adverse effects on the environment, the economy and the well-being of people.

Table 1: Main GHG changes based on my own research

Gas	Formula	GWPa	Atmospheric stor. t. in year year(év)	Atmospheric concentration	Changes (%)
carbon dioxide	CO ₂	1	50-200	280 ↑ 368 ppmv	+31
methane	CH ₄	23	8,4-12	700 ↑ 1750 ppbv	+151
dinitrogen oxide	N ₂ O	314	120	270 ↑ 316 ppbv	+17
sulphur hexafluoride	SF ₆	22200	3200	0 ↑ 4 pptv	
fluorinated hydrocarbons (HFC-s)					
HFC-23	CHF ₃	12 000	260	0 ↑ 14 pptv	
HFC-134a	CH ₂ FCF ₃	1300	14	0 ↑ 7,5 pptv	

HFC-143a	C ₂ H ₃ F ₃	3800	48		
<i>(perfluorocarbons PFC-s)</i>					
tetrafluoromet-hane	CF ₄	6500	50 000	0 ↑ 72 pptv	
perfluoro ethane	C ₂ F ₆	9200	10 000		
perfluoro prop-hane	C ₃ F ₈	7000	2600		
perfluoro hexane	C ₆ F ₁₄	9000	3200		
CFC-11	CFCl ₃	4600	45	0 ↑ 268 pptv	

My aim is to present shortcomings that hinder the effective implementation of my plan, hoping they will change. For a while this issue was not urgent, but today it enjoys a prime location in the thoughts of all people, in view of the above data, together with the burning issue of how to radically reduce CO₂ emissions. The proposal of my solution optimizes and uses the possibilities offered by our country, with emphasized importance on removing and using only such amount of natural resources available for providing energy to the population of Hungary, which can be returned to the environment, and natural resources are used only to a degree it is absolutely necessary.

I would like to say a few words of the possible geographical coverage of my plan. The Hungarian Government has been allocating and investing a great amount of funds for the energy remodelling of hospitals and schools. The rehabilitation programme includes churches throughout the Carpathian basin as well, besides the entire territory of our country. In addition, my plan can be implemented throughout the EU for old buildings, or buildings under protection in need of renovation. The plan, the strategy and the structure can be adapted to any region within the European Union. As long as there is sufficient supply of used polyurethane foam, the programme is sustainable, long term commitment and capacity building is guaranteed.

The resources of the earth are limited, therefore it is vital to only use natural resources to a degree it is absolutely necessary, furthermore, to preserve natural resources for future generations as well. Polyurethane has a vital role in preserving our planet's natural resources. Durable polyurethane coatings ensure that the life

cycle of any end products is longer than without such coating. Polyurethane supports the sustainability of energy as well. It assists architects in more efficient insulation of buildings, thereby reducing their gas, oil and electricity consumption, which materials would otherwise be used for heating and cooling.

In addition to saving energy and valuable natural resources, increasing emphasis is placed on finding solutions other than simply disposing of polyurethane products when they reach the end of their natural lifecycle (become obsolete).

With respect to the fact that polyurethanes are petrochemical-based polymers, it is important to recycle them whenever it is possible in order to avoid wasting this valuable raw material. There are a variety of recycling options, including mechanical, chemical and raw material recycling. Depending on the type of polyurethane, different recycling methods can be applied, such as grinding and recycling, or the gluing of small pieces together.

In case it is not reused, the falsely preferred solution is energy recovery. Measured in tons, polyurethane produces the same amount of energy as coal, therefore it is a very effective material for municipal waste incineration plants, and the energy produced is used to heat public buildings. Simply burning reusable polyurethane foam, and in this way generating significant emission of harmful substances, is contrary to the objectives of this project plan and strategy.

The least desirable option is placing polyurethane in landfills, which should possibly be avoided. Fortunately, this option is decreasing, as governments around the world are increasingly recognizing the value of waste in terms of recycling and energy recovery; and as the areas available for landfills in countries is decreasing.

The used polyurethane foam is available in large volumes, creating environmental impact. The idea is to construct heating-cooling panel system out of the "useless" waste material.

The polyurethane foam waste, which had already been placed to landfills, could be reused, the landfills could be reopened, giving back the territory for useful production.

Reaching nearly zero emission in buildings which are not newly constructed, old and/or in buildings under protection, hospitals, schools, museums, theatres or municipal/public buildings.

Creating a strategy where the renewable energy resources available in the close vicinity, such as thermal water, used thermal water, geothermal probe, micro turbine, solar systems, sea/ocean salty water, and waste water provide energy for buildings planned to be renovated with heating-cooling panel system, which is created out of recycled polyurethane foam.



Figure 1: Capillary pipes of a heating and cooling panel



Figure 2: Closed geothermal well, as a possible energy source
Source: Own research, Biharnagybajom, 2020



Figure 3: Plugged geothermal well, as a possible energy source
Source: Own research, Biharnagybajom, 2020

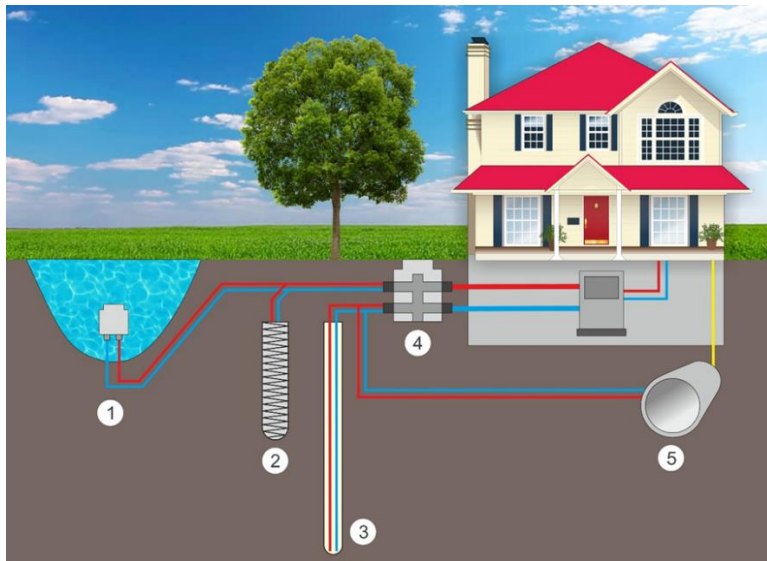


Figure 4: Own drawing and design, possible energy sources of a residential house
1: lake or well, 2, 3, 4: closed-loop geothermal probes, according to available area and energy needs



Figure 5: Different type of solar panels, by Onyxsolar

Literature review

Recent scientific and technological innovations made possible the exploitation of these traditional resources in a more effective way (Baros et al., 2012). There are many opponent judgements concerning this issue. Firstly some authors think that growing demands on biomass based energy resources endanger equilibrium of natural ecosystems mainly in sensitive areas. Globally the United Nation's FAO has coordinated many programmes concerning bioenergy (e.g. Bioenergy and Food Security Criteria and Indicators (BEFSCI) Project or the FAO Support Package for Decision-Making for Sustainable Bioenergy: Making Bioenergy Work for Climate, Energy and Food Security).

The shift towards renewable energy forms is an inevitable part of strategies trying to mitigate the challenges coming from climate change (Bujdos et al., 2013). Different types of biomass have been important energy resources for thousands of years (COYLE 2007, HADIYANTO 2012). Renewable energy also plays important role in other branches (e.g. tourism) (David et al, 2008).

I would like to explain in 9 points what means could be utilised during the plan to reach the objectives indicated above.

1. Clear and obvious introduction based on engineering studies, claiming that the plan reaches significant amount of CO₂ emission, the investment is measurable and tangible.
2. Accredited laboratory will be chosen to achieve the desirable result of the prototype
3. The prototype is created, modified and re-created until it fulfils the targeted result
4. The permissions are based on the lab test results. The lab obtains the requirements of the planned prototype from the authority issuing the permit.

5. Based on the engineering studies and the energetic audits, the prototype solution will be elected and approved by the authorities.
6. Assistance of attorneys will be available.
7. The design, the mouldings and the necessary machines will primarily be obtained from Hungary, and if that is not possible, from EU member states.
8. The machines involved in the production process will be planned to be as automated as possible, because the production is planned to be performed at multiple locations at the same time.
9. The building capacity is also applicable, because the Hungarian Government, as it has recently been announced, intends to renovate over thousands of old buildings

Material and methods

How does my plan relate directly to the environmental issues targeted by the project and to the project's objectives? How does it generally relate to the objectives of the targeted plan and reflect the degree of implementation of that plan? It is good question, isn't it? Here it comes:

At the end of the project, as a result, the inside climate of the building will be appropriate throughout the year. Fossil energy use is significantly reduced or in some cases not even needed.

Carbon dioxide emission is mitigated or even zero amounts can be reached, since in most of the cases, some kind of renewable energy source usage is feasible or is available near the renovated facility or building, (thermal water, used thermal water, geothermal probe, micro turbine, solar systems, sea/ocean water, waste water). The good practice can be delivered to other areas, regions or even to other countries, as there are large numbers of not newly constructed, old or protected buildings throughout the EU.

Considering the excessive number of household appliances produced – and the amount of polyurethane foam they contain – the used polyurethane foam is regenerated in big amounts causing environmental burden, therefore actions need to be taken. Besides reaching the goal of zero emission or nearly zero emission in the remodelled facilities, reducing, reusing and placing the used polyurethane foam into economical circulation is also one of the most desirable results of the project.

The combination or the appropriate cascade system usage of any geothermal system with the heating-cooling panel is inappropriate for wasting energy therefore the energy consumption of the remodelled buildings becomes even more efficient.

Developing the appropriate software for achieving inside climate in the remodelled room or building in the most appropriate way may provide additional opportunities for design engineers and architects in making the heating-cooling panel more suited for each designated building.

Overall, this is a situation equally beneficial for each participant. Lower energy consumption not only affects the broader topic of climate change and energy dependence, but an aspect closer to us as well, that is our energy bill.

1. What could the expected contribution of the project be to the implementation of the target plan/strategy?
2. All parts and components of the dismantled household appliances – mainly refrigerators – are recycled expect for the insulation polyurethane foam. In this project the foam will be recycled, and value is created again for the circular economy.
3. Recycling the used foam becomes a resource for new business models in the construction industry, architecture, design engineering, etc.
4. An average dismantling plant produces 5-6 metric tonnes of reusable polyurethane foam per day. The project intends to mitigate the waste by reusing it and creating low-cost heating and cooling panels.
5. Since the material to be used for the projected heating-cooling panel is a waste material, its adverse environmental impact can be avoided and value can be created out of waste, which is beneficial for the environment.
6. The plan is absolutely feasible for green public procurement, since the renovated old buildings can be heated and cooled by geothermal energy by using the proposed panel.
7. By reusing the foam, further load on landfills can also be avoided.
8. Volumes of the foam, which had already been placed in landfills, can be reused, and such landfills can be restored, giving back the territory to useful production.

Some data have been collected on the feasibility of the plan in 2 targeted hospitals in Hungary.

Results

Hospital “A”:

A building to be renovated, with a floor area of approximately 15.000m² (KEHOP – Environment and Energy Operational Programme)

New building with a floor area of 6000m²

Old building built in 1967, with a floor area of 1.500m²

The energy demand of the three buildings: 2,3 MW, at -15°C (t_b=23°C)

Annual average temperature: 4°C during the heating season

210 days when heating is necessary

150 days when heating is not necessary

105 days when cooling is necessary

Annual average performance: $1,15 \text{ MW} \times 210 \text{ days} \times 24 \text{ hours} = 5.796 \text{ MWh} = 5.796.000 \text{ KWh}$

Per square metre: 50% without panels, 50% heating-cooling panels

Annual energy requirements for the 50%: 2.898.000KWh

Closed-loop geothermal probe system:

Annual energy demand: 575KW

140pcs closed-loop geothermal probes – 100 metres deep

3900m² surface heating and cooling

According to the present status, the CO₂ emission per institutions is nearly 1.170 tons annually. A 300 KWh solar system had already been installed; additional 200 KWh will be installed in the near future. So the desirable nearly zero emission level can be reached.

Hospital “B”

The energy demand of the buildings: 3,9 MW, at -15°C ($t_b=23^\circ\text{C}$)

Annual average temperature: 4°C during the heating season

210 days when heating is necessary

150 days when heating is not necessary

105 days when cooling is necessary

Annual average performance: $1,95 \text{ MW} \times 210 \text{ days} \times 24 \text{ hours} = 9.828 \text{ MWh} = 9.828.000 \text{ KWh}$

Per square metre: 50% without panels, 50% heating-cooling panels

Annual energy requirements for the 50%: 4.914.000KWh

Closed-loop geothermal probe system:

Annual energy demand: 972KW

230pcs closed-loop geothermal probes – 100 metres deep

7.600m² surface heating and cooling

According to the present status, the CO₂ emission per institutions is nearly 2.000 tons annually.

Conclusions

The heating-cooling panel project is aimed at creating synergy between waste management, geothermal energy usage and improved vitality within the EU community:

1. The reduction of the amount of waste material
2. The idea of geothermal energy as a primary energy resource and good practice can be spread throughout the European Union.
3. Practical heating and cooling method may become available for the general public
4. Affordable heating and cooling method may become available for the general public
5. Reducing energy bills

6. Improving the efficiency of energy use
7. Significantly reducing carbon dioxide emission

In the near future the Government of Hungary intends to renovate or/and re-build over 500 schools, kindergartens, public buildings. The planned project and system is applicable to at least half of such buildings.

The Government of Hungary announced its general hospital rehabilitation programme; and the projected heating-cooling panel system can be installed in almost all of them.

It is clearly shown from the above that the strategy can be simultaneously implemented at different construction sites. As long as there is available used polyurethane foam for this purpose, and there are available buildings to be renovated, the project can be continuous and it can be adopted, too. It must be especially emphasized that the production and installation of the panels requires significant human labour.

Finally

Please allow me a personal example. A few years ago a construction investor approached me to visit my geothermal system in my home. Obviously showed him around, explained the concept, showed the utility bills, etc., like a good salesman. He seemed pleased of what he saw. At the end of the visit, He raised a simple question:

"I saw that your gas meter shows no gas consumption, the inside temperature is perfect 23 C degrees. (It was 40 C degree outside), but I did not see any magnet or equipment on your gas meter that blocks functioning the gas meter, how do you do that?"

(He suspected me stealing the gas and did not believe at all that geothermal probe and heat-pump enable to heat and to cool a house!)

In case the new product arising out of the aforementioned ideas is connected to heating and cooling energy-producing systems (thermal water, used thermal water, geothermal probes, etc.) – emphasizing and taking into account any local circumstances, the providing ability of the environment, the needs of residents and those working in the area – it can easily be assessed that the product proposed in the project (made of used polyurethane foam) is a solution applicable to public institutions, old buildings, protected buildings or blocks of flats in order to improve the work and life quality of the specific community, as well as to provide optimum energy use.

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