

Evaluation of the diversification of rural landscape in Slovakia after 1989 with a focus on the built-up area of municipalities: a case study of Podhájska municipality

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Abstract

The rural landscape in Slovakia was a synonym of agricultural production until 1989 and countryside has fulfilled specifically a productive function. Agriculture still plays a very important role in the Slovak countryside, but after 1989 there have been socio-economic changes in Slovak economy, which has reoriented to the market economy, resulting in changes of the ownership of enterprises, production processes and competition in the market. Countryside has been looking for new poles of development, what can be termed as the diversification of the functions of the countryside, i.e. the transformation of a mono-functional space into a multifunctional space. However, the increase in the amount of rural functions also results in changes of the land cover structure, which are most evident in built-up areas of municipalities. The aim of the paper is to evaluate the changes of the land cover structure of the rural landscape in Slovakia, focusing on the built-up area of the monitored municipality. The municipality of Podhájska, which is the centre of the Termál micro-region, was selected as the model territory and was researched as a case study. In this region, there is a constantly developing tourism, services and business instead of focusing only on agriculture. Changes in the land cover structure were monitored using aerial images from 1987 and 2014 (updated by field research) and the extent and nature of these changes were then analysed by Analysis tools in ArcGIS 10.2. The changes occurred in almost a quarter of the monitored area. Particularly, the use of gardens around houses has changed and they transformed from production to recreation area. The built-up area is also thickened and expanded under the influence of an increase of the tourism importance, especially in the area of former vineyards that had a long tradition in the municipality. The results of the research point to the loss of rural identity in case of increasing amount of function. Similar case studies should serve as base material for documents dealing with the sustainable development of rural areas.

Keywords: rural landscape, GIS, diversification, land cover structure, landscape changes

Development of countryside in Slovakia – an introduction

The rural space in Slovakia was influenced by several development periods before 1989, which shaped its function and visual aspect. Agriculture in the countryside advanced at the turn of the 19th and 20th century due to foundation of first agricultural cooperatives. After World War II the countryside was a synonym of agricultural production that provided food for the population. Since the

1950s the agricultural landscape has undergone radical changes. Löw, J. and MÍCHAL, I. (2003) mention the term of “communism in the landscape” and they see the main negatives in the central management. This period was characterized by a strong use of chemicals, mechanization and intensification in agriculture. United agricultural cooperatives have arisen, the mosaic of the landscape has been changed and the land was unified. In the 1960s, under the influence of industrialization, the young rural population has

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been moving out to towns and cities for a better quality of life. The rural population was, thus, very old (BURIAN, J. *et al.* 2013). In the 1970s and 1980s, the main well-developed catchment municipalities were formed, where all the activities and services were concentrated. The surrounding municipalities were on the downgrade.

After the collapse of communism, in 1989, the economy transformed from a centrally planned economy into a market economy (transition economy) in Central Europe. These countries have opted for a market mechanism, with the main elements of privatization, enterprise restructuring, market liberalization (ROLAND, G. 2000). The return of land and the increase of land trade have allowed the return of private farmers. Social development has resulted in the extinction of many agricultural cooperatives and businesses in rural areas and their insufficient use and dilapidation of agricultural buildings has been linked to the formation of brownfields. One of the most important elements of the transformation in the countryside was the restitution of land to the original owners. This change has not had a very powerful landscape manifestation, because the expected effect of the increase in private farming on land was not met due to the loss of bond of man to the soil, lack of domestic capital, aggravated conditions for agricultural business and especially legislative and administrative barriers (IZAKOVIČOVÁ, Z. 2012). Because of these barriers land owners can in many cases just rent their land to large-scale farmers or the land owners are still unknown.

Rural settlements are looking for resources for further development and want to gain the most of their potential. Their aim is, on the one hand, to maintain agricultural production and on the other hand to enable diversification into other activities, e.g. rural development towards a recreation and tourism and improvement of the lives of rural inhabitants (PĚLUCHA, M. *et al.* 2009). Negative is the loss of agricultural land as a result of the construction of new buildings (family houses, recreational complexes, manufactur-

ing enterprises), which often do not respect the environmental and visual aspects of the countryside. Unharmed remains of rural decline are also agricultural, state, residential or industrial and other brownfields. Of the positive phenomena of the transitive economy, it is worth mentioning environmental measures aimed at eliminating sources of environmental pollution.

In the last decade, there has been a focus on drawing the funds for revitalizing dilapidated and unused land and brownfields in the countryside. Revitalization (revival, return of life) means the correction of an anthropogenically affected landscape or its part into a state connected with nature, a state approaching the original state.

Multifunctional countryside

At present, new terms associated with land use, as well as land use in the countryside multifunctional land use (NÉMETHOVÁ, J. 2010), integrated land use (SPIŠIAK, P. 2005) are being used. In the document *The Future and Rural Society* (1988), a “new rural model” was presented and demonstrated. The countryside is not only perceived as a place for agricultural production, but it also becomes a place for small and medium-sized enterprises of a non-agricultural nature. Also, the countryside becomes a place for recreation and also becomes a basis for the ecological stability of the environment. The production function is receding and is replaced by consumption (land purchase, home, tourism associated with the consumption of traditional meals and drinks in local restaurants, visits of organized events, etc.) (HRUŠKA, V. 2013).

The concept of multi-functionality has been gradually applied not only to agriculture but also to the countryside as a whole. HOLMES, J. (2006, 2012) regards the multifunctional transition as a transition from production to consumer and conservation functions. There is also a new strong political force in the countryside-environmentalism.

Multi-functionality and environmentalism included in concept of “green infrastructure” are becoming highly relevant for rural areas and landscapes. A significant impact on the development of the countryside and its renewal was the entry of Slovakia into the European Union in 2004.

Rural landscape as an object of research

Woods, M. (2011) argues that from the perspective of geography is viewed mainly the agriculture, the impact of human activity on rural areas, rural studies and land use. The benefit of this view on the countryside lies mainly in placing emphasis on spatial differentiation and exploration of the landscape and its interaction with the human factor. The impact of the human factor as the main actor of agricultural activity in the countryside is the subject of many studies, but the emphasis is put largely on the non-built-up area where this agricultural activity predominantly takes place. In scientific papers dealing with the rural landscape in Slovakia, we can find studies focusing mainly on the change of the land cover structure (KANIANSKA, R. *et al.* 2014), the impact of tourism on the landscape (KLAUČO, M. *et al.* 2017), diversification of the rural landscape (MÁLIKOVÁ, L. and KLOBUČNÍK, M. 2017), function of agriculture in countryside (BAZIK, J. and MUCHOVÁ, Z. 2016; ŠPULEROVÁ, J. *et al.* 2017), rural population (SIMPACH, O. and PECHROVÁ, M. 2016), green infrastructure and sustainable countryside (TÓTH, A. *et al.* 2016), the potential of the rural landscape (ŠTĚPÁNKOVÁ, R. and BIHUŇOVÁ, M. 2012) or multi-functionality of the countryside (BEZÁK, P. and MITCHELLEY, J. 2014; BOHÁTOVÁ, Z. *et al.* 2015).

The change of rural functionality is evident mainly in built-up areas of municipalities, where new buildings, a change in the image of the countryside, revitalization, concentration of services connected with new functions are noticeable (NOVÁKOVÁ, G. and ŠEBO, D. 2016). Not only in Slovakia, but almost in every European country is tourism

one of the most significant driving forces in countryside. People want to spend time “close to nature” or they just want to “enjoy the countryside” (KULCSÁR, N. 2015). These all research point out to gradually increasing multi-functionality of countryside.

The main research question is how the multi-functionality of countryside caused by socio-economic changes after 1989 in Slovakia has influenced land cover structure of built-up area of countryside. The aim of this paper is research the changes in the land cover structure in the built-up area under the influence of functional changes in the countryside after 1989, pointing to the fact that the mono-functional countryside is becoming a multifunctional countryside and how the landscape diversifies and how new functions enter into it. For this research we need to make comparison of land cover structure between two periods – before 1989 and current state. Therefore, the goal is to create maps of land cover structure using aerial images and then to assess the most significant changes in landscape.

Study area

The municipality of Podhájska is located in western Slovakia, in the Nitra self-governing region, in the district of Nové Zámky (Figure 1). The total area of the municipality in 2017 was 11,116.3 ha and the number of inhabitants reached 1019 (31.12.2017). Podhájska is a centre of Termal microregion, which consists of 13 municipalities: Bardoňovo, Čechy, Dedinka, Dolný Ohaj, Hul, Kolta, Maňa, Podhájska, Pozba, Radava, Trávnica, Veľké Lovce and Vlkaš. Podhájska was founded in 1960 by the unification of two municipalities – Belek and Svätuška, whose history dates back to the 11th and 12th centuries.

This municipality was selected as the model territory and case study on the basis of the results of the multi-criteria analysis in which it ranked first and reached the highest level of diversification among the 13 municipalities of the micro-region (ŽONCOVÁ, M. 2017)

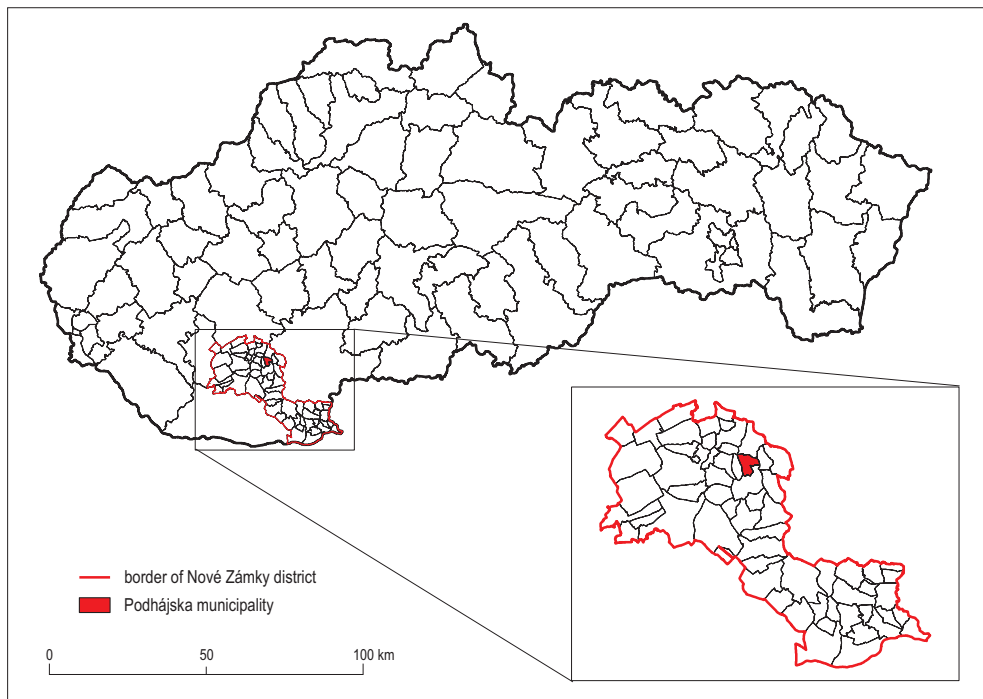


Fig. 1. Localisation of interested area of Podhájska municipality in Slovakia. Source: Žoncová, M. by ArcGIS 10.1

and also because of the increasing importance of another function (non-agricultural). Nowadays, the landscape in this area is partly formed by the development of tourism, which is developing thanks to the ever-growing popularity of the thermal aquapark in Podhájska. Podhájska is well-known for the thermal aquapark and thanks to it, the TREND journal ranked this aquapark on the 5th position in the most visited places in Slovakia in 2005 (TREND, 2006) and on the 52th position in the ranking of the most profitable companies in Slovakia in period 2012–2016 (HALUZA, I. 2017). The municipality of Podhájska has a hilly relief, which is largely used for agricultural activity. The territory is rich in mineral and thermal waters with the most important locality in Podhájska, where water is used for treatment of the locomotive system, the respiratory system and skin eczema. Tourism has begun to build its

prominent position in 1973 when workers of Nafta Gbely Company began drilling under the vineyards behind the Liska stream and after reaching a depth of 1,900 meters, 90 °C of hot water was fired. The citizens built here in 20 days two swimming pools, which are in function until today. This rural municipality has looked for new poles of development after 1989 because of decline of agriculture and increase of unemployment.

Data

Land cover structure can be interpreted in orthophoto images in different ways. In European countries, the most widespread interpretation is currently based on CO-RINE Land Cover methodology (FERANEC, J. and OŤAHEL, J. 2001) or Urban Atlas data (PAZÚR, R. *et al.* 2017). We were able to ob-

serve changes in the landscape structure using aerial images in software ArcGIS 10.1 by creating maps of land cover structure from two observed years:

- 1987 – for creating map of land cover structure, we used panchromatic (black and white) aerial photos provided by Topography Institute of Colonel Jan Lipsky in Banská Bystrica (TICJL) with resolution 58 cm/1px.
- 2016 – for creating map of current land cover structure, we used the newest aerial photos (from 2014) provided by web portal “mapy.cz” with resolution 25 cm/1px. We also checked and updated land cover structure on these photos with field research, which took place in 2016. Although the latest available satellite imagery is available on Google Maps, these images do not match the quality level needed to get close to the built-up areas of the municipalities.

Methods

Creating maps of land cover structure in 1987 and 2016

For comparing and analysis of changes in built-up area of Podhájska, we made maps of land cover structure in 1987 and 2016 using the aerial images. The next step in processing aerial images is their geo-referencing, digitization and subsequent vectoring of landscape elements in ArcGIS 10.1 over the reference periods. The mapping of the landscape structure in the *built-up area of Podhájska* was implemented in detail into the level of *landscape elements*, which are grouped into eight *groups of landscape elements* (FERANEC, J. *et al.* 1996; RUŽIČKA, M. 2000; VOJTEKOVÁ, J. 2013):

- Elements of forest vegetation (monitored landscape elements: groves);
- Elements of grasslands and pastures (occurrence in the observed area was not recorded);
- Elements of agricultural lands (monitored landscape elements: fields; vineyards);

- Elements of rocks and raw soils (occurrence in the observed area was not recorded);
- Elements of water courses and water bodies (rivers, streams);
- Elements of settlement and recreational areas (individual housing area; collective housing area; gardens of houses (production); gardens of houses (recreational); churches, chapels, bell towers; cemeteries; statues, crosses, sculptures; sport fields; swimming pools and aquaparks; playgrounds; buildings of public administration; preschool and school facilities; retail trade facilities; medical facilities; restaurants; cafes and pubs; cinema; paved sidewalks; parks, residential grasslands woods and scrubs; hotels, guesthouses; private accommodation; apartment houses; campsites; other unused areas);
- Elements of technical structures (industrial areas; farms, agricultural yards);
- Elements of transportation (main roads; other roads; railway line; parking; bus stop and station; gas station; railway station).

When mapping accommodation facilities, we combined a number of information sources available information from the internet (www.ubytovanienaslovensku.sk), from the municipal websites as well as from field research. Subsequently, we have categorized accommodation facilities according to their equipment (hotel, pension, apartment house, private accommodation, etc.). We also distinguish two types of gardens – *recreational* and *production* gardens. The main difference was visible on aerial images, where in recreational gardens were visible pools, lawn, parking places, gazeboes, etc. and their function consists in aesthetic, relax and fun. On the other hand, in the production garden was considerably visible a segmentation into small zones, where people grown their own vegetable and fruit. Based on the predominance of one function, the garden was included in the one of these categories.

From aerial images, only *size*, *localization*, but not the *function* of the building, can be seen. OŤAHEL, J. and FERANEC, J. (1997) high-

light the importance of field research in determining the function of objects and detailed mapping of the territory over a longer period of time with a maximum of information. Since the function of an object is not readily recognizable from an aerial image, it is important field research to determine the functionality of each object and its localization. When creating a map of the secondary landscape structure in 1987, we consulted the function of the buildings in this period with the mayor, the employees of the information office, but also with the inhabitants of the municipality. We also studied archive records where we found out, for example, when the building of a shop, a cooperative, a general office, schools were built. We also reached statistical database of accommodation facilities from Statistical Office of Slovak republic and municipal databases.

Analysis of changes in land cover structure

To analyse changes in the landscape in ArcGis 10.1, several methods have been developed that are engaged in detail by Singh (1989). In our research, we have used the *Intersect* tool in ArcToolbox (Analysis Tools → Overlay → Intersect) to create intersections of existing layers (in our case, the two monitored years) and a new layer is created with an attribute table with data from both layers. The “Intersect” tool for analysing changes in the landscape structure was also used by MACKENZIE, J. (2009), BENINI, L. *et al.* (2010),

CHIRICI, G. *et al.* (2006) and COUGHLAN, M.R. (2014). In the newly created layer which is created with the Intersect function, we can then select polygons in the attribute table that have the same code of landscape element group in both observed years.

Subsequently, the selected polygons are exported to the new layer that characterizes the areas in which the changes occurred in the two observed years from one landscape elements to another. In this way are identified areas in the landscape that were subject to change. Because we have linked two attribute tables using Intersect function, we can also identify the nature (character) of the change, i.e. to determine changes from one landscape elements to another landscape element. To analyse the nature of the changes, we calculated the extent of all existing polygons (areas). Subsequently, we calculated the percentage of landscape elements in year x changed to landscape elements in year y from the total area of the changed landscape structure in the observed area in the time horizon of years $x-y$. Based on the results, it is possible to create scenarios for the future development of the landscape of the monitored area.

Results

On the basis of the map comparison, we found out that the changes were observed on an area of 367,145.7 m² of the total area of built-up area of 1,670,420.4 m², which is nearly 22 per cent change (*Figure 2, Table 1*). Changes

Table 1. Change of the area of different landscape elements in the municipality of Podhájska between 1987 and 2016

Indicators*		Change of the area of landscape elements in %, 2016				
		F	A	U	Ts	Tr
Change of the area of landscape elements in %, 1987	F	0.00	0.84	2.03	0.00	0.00
	A	1.85	3.50	32.25	0.00	3.34
	U	0.00	0.73	37.04	0.00	3.93
	Ts	0.49	0.00	1.05	11.52	0.18
	Tr	0.83	0.00	0.40	0.00	0.03

*Elements of: F = forest vegetation; A = agricultural land; U = urban and recreational areas; Ts = technical structures; Tr = transportation



Fig. 2. Localisation of landscape structure changes in built-up area of municipality of Podhájaska. – F, A, U, Ts and Tr = for explanation see Table 1. Source: Žoncová, M. by ArcGIS 10.1

also occurred in the percentage representation of individual groups of landscape elements (Figure 3). The most visible is the decline in the area of the group of agricultural land elements and the increase in the area of the group of settlements and recreational areas.

In terms of the number of changed landscape elements (Table 2), the number of landscape elements has increased from 1987 to 2016. During this period, 14 landscape elements were transformed into 27 landscape elements. Based on this result, we can claim that the country has diversified considerably and that the observed built-up area becomes more multifunctional

Transformation of gardens

Approximately one fifth of changes in the observed built-up area consisted in the transformation of the house gardens. In creating a map of the current landscape structure, we have included a new landscape element “recreational garden” in the list of landscape elements. We considered it important to define this landscape element, because these areas form a considerable area of the built-up area of municipality (recreational gardens [7.6%] and production gardens [35.9%] in 2016) and therefore it is necessary to pay increased attention to this type of land cover.

The original (former) functional use of houses gardens for growing their own crops, fruit and vegetable gradually disappears and the gardens are transformed into recreational purposes. In such gardens, new features are visible, which was not seen in 1987 (swimming pools, trampolines, large parking spaces, playgrounds, sports grounds, grassy areas, gazebos, fire rings, ponds, ornamental plantings, etc.) (Photo 1).

In contrast to the recreational garden, the production garden is on aerial picture characterized by a miscellaneous structure, space division, more regular mosaic. There is also a higher occurrence of trees in a regular mosaic, which suggests a possible fruit planting. In these gardens, there have also sometimes been farm buildings, which are related to self-sufficiency and work in the garden. However, in many gardens there is also a change of structure, which means that the aerial view on the garden appears to be cultivated only in a certain part, the rest of the land is unused.

This change is also related to the growing importance of tourism in the municipality and, consequently, to the growing number of accommodation facilities. Owners of accommodation want to satisfy all the needs of the tourist and create the most pleasing, visually attractive and clean environment for them. In many cases, it is a redevelopment of existing family houses to accommodation facilities. Individual hous-

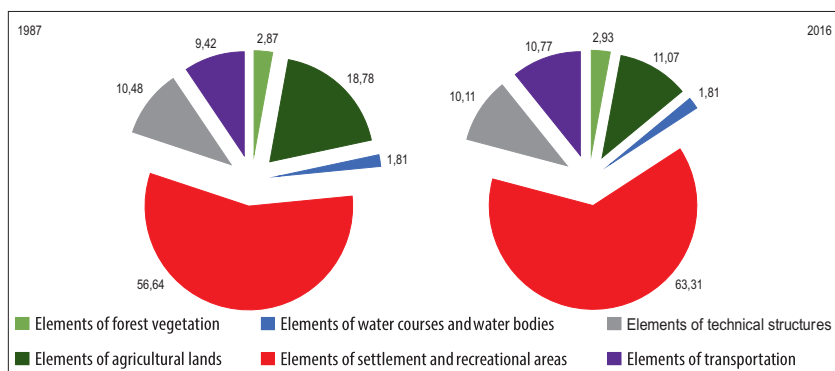


Fig. 3. Landscape structure of built-up area in municipality of Podhájska in 1987 and 2016 in per cent. Source: Authors' own research

Table 2. Percentage change of the secondary landscape structure in the municipality of Podhájska in 1987 and 2016

Indicators	Landscape elements* in 2016																				Sum							
	L1	P1	P2	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	S13	S14	S15	S16	S17		S18	T1	D1	D2	D3	D4	D5
L1	-	0.84	-	0.11	-	-	-	-	-	-	-	-	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
P1	0.88	-	3.50	0.53	0.12	-	-	-	-	0.09	-	0.99	0.03	0.48	-	-	0.12	0.01	1.74	-	-	-	-	-	-	-	-	-
P2	0.97	-	-	0.33	-	-	-	-	-	-	-	0.20	0.14	-	2.76	2.02	3.05	9.03	7.14	-	-	-	-	-	-	-	-	-
S1	-	-	-	-	0.21	-	-	-	-	0.02	-	0.23	1.28	0.32	-	-	-	0.11	0.07	-	0.03	-	-	-	-	-	-	-
S3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
D1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
D2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
D3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
D4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
D5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sum	3.17	1.57	3.50	2.91	0.51	0.02	0.75	0.77	0.11	0.31	2.62	3.47	4.72	1.25	2.76	6.19	11.37	34.35	0.31	0.14	0.22	11.52	<0.01	1.10	5.71	0.65	0.01	100.00

*L1 = groves; P1 = fields; P2 = vineyards; S1 = individual housing area; S2 = sport fields; S3 = swimming pools, aquaparks; S4 = retail trade facilities; S5 = restaurants; S6 = collective housing area; S7 = paved sidewalks; S8 = parks, residential grasslands, woods and scrubs; S9 = hotels, guesthouses; S10 = private accommodation; S11 = apartment houses; S12 = campsites; S13 = other unused areas; S14 = production gardens of houses; S15 = recreational gardens of houses; S16 = cinema; S17 = playgrounds; S18 = catés and pubs; T1 = industrial areas; T2 = farms, agricultural yards; D1 = main roads; D2 = other roads; D3 = parking; D4 = gas station; D5 = railway stop and station. - Highest values in italics.

ing areas were transformed into accommodation facilities, namely private accommodation (1.3%) or hotels, guesthouses (0.2%).

The accommodation capacities were also created by the addition of new buildings in the rear parts of the gardens. This method of transforming house gardens into accommodation (hotels, guesthouses, private accommodation, apartment houses) represented almost 5 per cent of the total area of the changed landscape structure. In this case, part of the garden is often used for the original purpose (growing crops) and the second part of the garden for recreation.

Another significant part of the changes (16.2%) was the transformation of arable land into house gardens. Most of them were converted into functional house gardens (9.0%) and rest into recreational house gardens (7.1%). This phenomenon is related to the building of new houses and also gardens. The new houses were mostly created for the residential function of the domestic population as well as for accommodation for tourists. Agricultural land has reduced its area to the detriment of the increase of parking space.

Development of tourism

As the private business in Slovakia started only after 1989, there was no accommodation capacity in the municipality before that year. However, according to the data from the website ubytovanienaslovensku.sk and the Business register of Slovak republic, accommodation capacities increased significantly after year 2000.

In the former vineyards, a new urban area is created, which fulfils the recreational-residential function. There are new large accommodation facilities such as guesthouse Quatro IV, guesthouse Andrejka, guesthouse MeryJan (Photo 2). Large-capacity guesthouses were also built in other parts of the municipality, but not so many (Photo 3).

Private accommodation prevails in the local area of Svätuška. Local residents provide their houses, parts of their houses, separate outbuildings, or separate cottages in their



Photo 1. Example of recreational garden (A) and production garden (B) on aerial photo. *Source:* mapy.cz, 2017

gardens. Most of private accommodation facilities are located in the north of the built-up area of municipality. Around the private facilities, the functional gardens are transformed into recreational gardens. With this way were created several new recreational gardens, representing 3.6 per cent of the total changes.

Part of the agricultural land was transformed into a camping site (2.8% of the changes), which was built south of the thermal swimming pool to increase the accommodation capacities in the municipality.

The changes took place also in the area of the thermal swimming pool. The area did not



Photo 2. Accommodation facilities in the vineyards area. Source: ubytovanienaslovensku.sk



Photo 3. Large-capacity guesthouses beyond the vineyards area. Source: ubytovanienaslovensku.sk

grow, but it was thickened. In the area of the swimming pool there are new accommodation facilities connected directly to the swimming pool area, new parking areas, new restaurants, sports fields, swimming pools. In 2007 the hotel Borinka was renovated in the area of the swimming pool and the capacity of the hotel was increased. A new Aquamarin wellness center was also completed in 2012.

Multifunctionality of Podhájska

A spatially large change, but only in one location, was the change in the use of the former agricultural complex in the local part of Belek, where this facility is exploited by Kraintek company since 1990. There was a transformation from the area of the agricultural cooperative to the *business area*. New buildings have been built in the area and decorative surrounding greenery has been planted. The whole area was so completely revitalized. The transformation of the former agricultural area also took place in the western part of the municipality, where part of the area is currently used as a shop of building material. The rest of the built-up area still functions as an agricultural cooperative and part of the area comes into brownfield.

New landscape elements are also coming to the countryside, not very typical for this environment. In Podhájska is a *cinema* with an outdoor projection. In 2016, the cinema started its year-round operation in the interior, where is a *café*, too. In the summer, various cultural events are organized.

The new landscape element in the village is also the P-Petrol *gas station* on the main road, which originated on an area that had not previously been used.

However, it is important to note that there are not only changes in the area but also *functional changes* in the municipality of Podhájska. For example, this situation is reflected in the use of the building of the General Office, but also in the use of residential buildings for small and medium-sized enterprises. In the past there was only a mu-

nicipal office, currently a municipal office, a library, an information centre as well as a cultural and social centre are housed in the building. A similar situation also occurs in the building on Senčianska Street, where there are groceries, a beer house and the accommodation was completed on the floor.

Discussion

The monitoring of changes in the landscape structure of the countryside in Slovakia, influenced by natural or anthropogenic factors is also the main object of the research in scientific studies by MALENOVÁ, P. (2007), ŠOLCOVÁ, L. (2012) and VOJTEKOVÁ, J. (2013). They also use aerial photos for detecting changes in landscape. BOLTŽIAR, M. (2008) claims that the highest advantage of using aerial images is the presentation of the Earth's surface and providing a number of quantitative but especially qualitative information about the individual objects of the landscape whose dynamics can be monitored at different time horizons.

In the Corine Land Cover methodology, a more detailed legend was used to map the landscape cover at a scale of 1:50,000, used by many authors in their works (SVIČEK, M. 2000; CEBECAUEROVÁ, M. 2004). We agree with the opinion of KOPECKÁ, M. (2006), which states that the Corine Land Cover legend does not allow to interpret changes that are important especially in terms of local ecosystem biodiversity (for example, to quantitative reduction of forest vegetation or loss of gardens to the detriment of dissemination of built-up area, evaluate the revitalization of municipalities, etc.), which we also consider to be its main disadvantage.

Based on the map comparison, we found that the changes occurred on an area of 367,145.7 m² of the total area of the built-up area with area of 1,670,420.4 m², which represents 22 per cent change. The most visible is the decline in the area of the group of agricultural elements and the increase in the area of the group of settlements and recreational areas.

When we researched the changes in the landscape structure of the municipality of Podhájska, we have spatially and on a percentage basis analysed the landscape structure in 1987 and 2016. In creating the maps in 2016, we set out a new landscape element – recreational garden. Currently, more than 7.5 per cent of the area is covered by recreational gardens in Podhájska. Changes in the use of gardens are also analysed in research of ŠUPUKA, J. *et al.* (2013), who have observed gardens in the municipality of Tvrdosovce, where up to 25 per cent of gardens are recreational gardens.

When we analysed types of accommodation facilities, there was problem to categorize them according to their quality classification. In this categorization, we found out inaccuracies when accommodation facilities use a different nomenclature of facility in their name, but they do not actually meet the conditions (e.g. they are referred as a guest house and do not meet the conditions). BUČEKOVÁ, I. (2007) points out this problem, when she examined the network of accommodation facilities in Bratislava. We also consider alarming that accommodation facilities are glutted and concentrated in one municipality.

This enormous increase of commercial and private accommodation facilities also occurs in spa town Mórahalom in Southeast Hungary, where in 2000 only 3 families offered accommodation and in 2009 nearly 80 did. The changes caused only smaller conflicts according to the questionnaire because of tourists parking everywhere. Tourism in general is a fragile business, which depends on many internal and external factor, therefore, a regional economy based only on tourism will never be sustainable (MARTYIN, Z. 2015). Accommodation facilities should also concentrate to surrounding municipalities and focus attention on traffic services. According to KULUSJÄRVI, O. (2016), a move from “a resort-oriented tourism” towards “a region-based tourism” should be made to achieve long-term business success and sustainable regional development.

Conclusion

Changing the socio-economic and political conditions after 1989 has resulted in rapid changes in the economy, the way of life of the population, which was reflected mainly in the change of the landscape structure. Based on the research of changes in the landscape structure in Podhájska municipality, we can assess the impacts of the transitory economy on the landscape and identify their positive and negative aspects.

Based on the results of the research, we can identify *five basic trends* in the development of the observed area, i.e. to define the basic processes that are characteristic for the current countryside: new building, expansion of built-up area of municipality, thickening of the built-up area, change of the function of the areas, revitalization. Countryside is thus becoming a multifunctional space that does not provide only an agricultural function. For this reason, the relationship of the population to the land is often lost, what can be caused also by the fact, that inhabitants are originally from a city and have urban style of life. An emphasis should therefore be placed, on the one hand, on deepening the relationship between man and the countryside, and, on the other hand, on keeping the “genius loci” through the protection of the natural and cultural heritage.

We consider it important to study the changes in the gardens (around the houses), because they form a large part of the built-up area of municipality. The use of gardens is closely related to the intensity of the relationship of the population to the land, which could lead to increased awareness of the growing of own crops on their own parcels. In this way, the relationship of the population to the soil could be revitalized. Attention should also be paid to the disappearance of vineyards around the swimming pool and their transformation into area with accommodation facilities. The vineyards form an integral part of the landscape and increase its heterogeneity, create the landscape image for a long time in the municipality of Podhájska. The direction of the municipality develop-

ment should also be focused on the support of viticulture or the development of tourism associated with wine tourism.

This work can serve as an example for exploring the changes of rural municipalities and can be used as a basis for further research, for example, for comparing rural changes in other regions or countries, or creation scenarios of future development. These findings can also serve as a base material for further spatial planning of the surrounding municipalities of the Termál micro-region. Then, tourism development would better contribute to socioeconomic development and well-being in local communities. In the next research, it would be interesting to compare the diversification of the rural landscape of a similar micro-region or with other regions or countries of Central Europe (e.g. with regions from the Czech Republic, Hungary or Poland).

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