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PROTECTION AND PRESERVATION OF TRADITIONAL AGRICULTURAL LANDSCAPE WITH DISPERSED SETTLEMENTS AS AN EXAMPLE OF TRADITIONAL LANDUSE IN THE KYSUCE REGION (NORTHWESTERN SLOVAKIA)

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Abstract

The aim of our work on the Kysuce region was to map the incidence of preserved TAL elements, assessment of their contemporary usage and assessment of the threat to them under the influence of anthropogenic and natural stress factors. To do so, it was crucial to understand space and time intersection of TAL existence, the interaction of socio-economic, abiotic and biotic systems of the landscape and assess correctly the contemporary trends of the evolution of society and the threat to the agrarian heritage resulting from it. High proportion of TAL, covering 12% of the whole area, is typical for the monitored region. There were two types of TAL: TAL with dispersed settlement, covering 2261.4 ha of the area (3%) and TAL of arable-land, grasslands, covering 6990.3 ha of the area (9%). In the agricultural country, TAL makes up for important stabilizing elements and their presence increases biodiversity in these regions. It is of high importance to classify TAL as significant landscape features that are important as local bio-centres (because of their benefits for society and the environment).

Keywords: traditional agricultural landscape (TAL), dispersed settlements, landscape changes, land use, protection

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INTRODUCTION

The highest number of preserved historical structures of traditional agricultural landscape (TAL) in Slovakia is in areas of "kopaničiarske" (dispersed) settlement. "Kopaničiarske" settlement represents an autonomous example of socio-economical activity conditioned by specific natural and historical conditions. It evolved as a product of the youngest colonisation waves (Wallachian colonisation) and its genesis was highly differentiated by space and time. TAL is composed of mosaic structure of intensively used small-scale elements of arable land and permanent cultures that have evolved by continuous succession that lasted for several centuries. These areas represent regions with specific combination of natural and cultural diversity, including high visual quality of the terrain. Nowadays, they are preserved as small remnants surrounded by intensive agricultural soil or forests, they are becoming a rarity and that is why they are so invaluable in Europe. Traditional agricultural landscape (TAL) represents an area where traditional agricultural methods are used and its biological diversity is preserved as well (Harrop 2007). TAL represents a significant mosaic of diverse communities important because of the high incidence of plants and animals.

History has recorded many subsequent changes of landscape, often with damaging consequences that caused the loss of diversity and unity of the landscape elements and significantly affected TAL character (Antrop 2004, 2005, Benayas and Bullock 2012, Marini *et al.* 2011, Supuka and Stepankova 2004). That is why TAL has survived, but is only scattered on small areas in some regions. Traditional systems of soil usage in Europe continue mainly in mountainous and remote areas where physical restrictions are in prominence and which prevented modernisation of agriculture (Plieninger *et al*. 2006).

In 1950 – 1990 a rapid and vast structural change in agricultural landscape occurred in Europe caused by intensification and mechanisation (Donald *et al*. 2001, Schmitzberger *et al*. 2005). Intensification of agriculture was linked with collectivisation and removal of balks, grove and bankside vegetation, decrease of arable land, meadows and forest mosaic. Landscape mosaics were transformed into large-block arable fields. It was only in the less accessible, less fertile locations that the original agricultural landscape was partially preserved and the cultural-historical character of the area was not lost.

The interest in preserving the integrity of traditional landscape came about from European Landscape Convention, after real threats of loss of the traditional landscape. The concept of high natural value (HNV) of agricultural land originated after the Common Agricultural Strategy (EU/1257/99) (Andersen *et al.*, 2003, EEA/UNEP 2004). Three types of HNV agricultural areas were defined (Paracchini *et al*. 2006): (I) agricultural land with high proportion of semi-natural vegetation; (II) agricultural land with a mosaic of agricultural, natural and

structural elements of low intensity and (III) agricultural land supporting rare types or low proportion of European or world population. The HNV concept has not been successfully implemented into Slovak legislative, nationally the organs created expert platform to identify indicators of HNV and the scope of HNV in agricultural country (Plassmann 2013).

There are 42 085 ha of TAL in Slovakia, which comprises only 0.9% of the whole country of Slovakia (Špulerová *et al.*, 2011). These areas are currently not subjects to specific protection and trends in decreasing farming and shifting from the traditional farming is evident. On the other hand, these areas are significant not only from the point of view of biodiversity, but they have invaluable ecological, cultural and historical values beneficial to the society. With regards to the change of climate, they play an important role in retaining water and protection of soil from erosion.

MATERIAL AND METHODS

The Kysuce region takes up NW part of Slovakia on the borders with the Czech Republic and Poland. Natural conditions of the region comprise a wide spectrum of geological subsoil, soil, indented relief and varied mezo- and microclimatic conditions.

The mapping of the country was based on holistic principle that combines various scientific disciplines. It is a transdisciplinary landscape concept based on the following five dimensions of the landscape: space entity, mental entity, time dimension, interrelations between nature and culture and systemic characteristic of the country (Tress and Tress 2001). The landscape is mapped as a hierarchical structure, which means that its extreme intricacy is reduced into complex subjects. It is crucial to understand the mutual effect of space and time, the effect of socio-economical, abiotic and biotic systems of the landscape to determine the current trends and threat to the agricultural landscape, preserving the natural heritage and defining scenarios and strategies of TAL management. Our methodological approach stems from LANDEP methodology (Ružička and Miklos 1990) and methods based on multidisciplinary integration and multistage approach (Van Eetvelde and Antrop 2004, Cullotta and Barbera 2011).

The mapping was primarily aimed at identification of areas with TAL, mapping of the specific types and forms of anthropogenic relief and overall assessment of the area in terms of preservation of TAL. Currently the mapping process continues at a more detailed level and it also focuses on the detailed mapping of the state and changes in biodiversity, which in the given territory is conditioned on the existence of TAL.

As part of a nationwide mapping of TAL four types of TAL were defined in terms of land use: 1) TAL with Dispersed Settlements, 2) TAL of Vineyards,

3) TAL of Arable-land, Grasslands and Orchards, and 4) TAL of Arable-land, Grasslands (Špulerová *et al*. 2011, 2012). In the territory of Kysuce region the vine is not grown, neither larger area of orchards have been preserved, therefore, these two types of TAL are not found in this territory. On the other hand, some specific features are found in the character of dispersed settlement and in the mosaic of TAL of arable-land, grasslands and pastures with various representation of non-forest woody vegetation.

Based on the findings from the mapping of terrain there were only two types of TAL earmarked within the monitored territory of Kysuce region: TAL with Dispersed Settlements and TAL of Arable-land, Grasslands. Integration was processed by using geographical information systems (ArcGIS 10.0 software) to present results at the landscape level and to allow comparison between different regions.

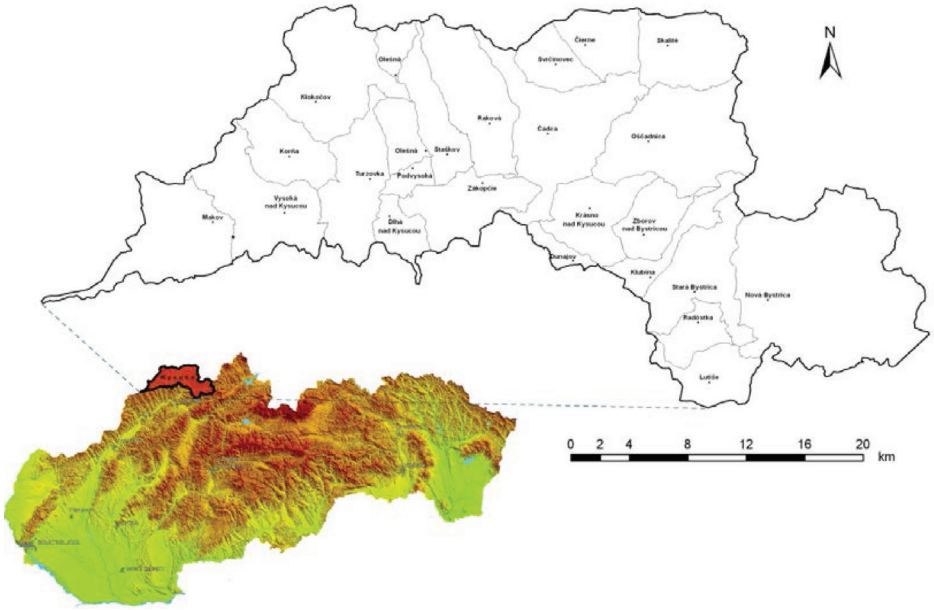

Figure 1. Localisation of study site

Study area

The Kysuce region is located in the north part of Slovakia and from the orographic view it covers a part of the Slovak-Moravian Carpathians, Western Beskids and Middle Beskids. In the west, it is limited by the state borders with the Czech Republic that run along the ridge of Javorníky Mts. and Turzovská vrchovina Mts. In the northwest, the region's borders pass alongside the Moravsko-

Sliezske Beskydy Mts. and Jablunkovské medzihorie Mts. In the northeast, the Kysuce region neighbours with Poland, while the borders pass along the ridge of the Kysucké Beskydy Mts. In the east the borders of the region reach the eastern edge of Kysucká vrchovina Mts., which together with the Kysucká brána Gate, also form the southern border of its territory. Southwestern part of Kysuce region is represented by Javorníky Mts.

This region was determined on the basis of natural-residential types of regions of Slovakia. The monitored territory of Kysuce region represents 24 cadastral areas (Figure 1).

RESULTS AND DISCUSSION

The Kysuce region is characteristic by "kopaničiarske" settlement (it belongs to the Jarovníky Mts.-Beskyds "kopaničiarska" area). The indented relief with flat ridges was a very good predisposition for intensive settlement of this area with distinctive dispersed type of settlement. The original settlement was scarce and villages were formed. "Kopaničiarske" settlement is linked to the "Wallachian" colonisation that started here in the 15th century and continued during the 16th and the 17th centuries. "Wallachian" colonisation significantly influenced the natural characteristic of the country. Originally, the forest area was gradually clear-cut, new settlements sprang up, pastures, meadows and fields were made. The dispersed settlements caused dispersion of agricultural land as well. The agriculture here was extensive and underdeveloped due to the lack of more favourable and sometimes even untimely natural conditions. Often unsuitable clear-cutting of the trees (especially old hillsides) led to intensive soil erosion. Big changes in landscape structure and usage of the area arose in the era of "kopaničiarska" colonisation that continued until the beginning of the 20th century. From this era, we have the highest number of preserved historical structures. The breakthrough era in the style of agriculture on agricultural land was the era of collectivisation in the 50s and 60s of the 20th century when the individual private ownership changed into collective ownership. At this time, it was the first time that TAL was affected extensively and negatively. Nowadays, TAL existence is mainly influenced by the abandonment from the small farming way of farming and new construction in the context of the expansion of towns and villages.

In the past, in TAL was predominant arable land, however, nowadays preserved TAL forms are used as meadows and pastures, less as arable land, rarely as orchards. Moving from the traditional agriculture, huge part of plots is gradually being covered by wood. Dispersed settlements are gradually transformed into elements used for recreation and tourism (they fulfil recreational function mainly) and on plots and their vicinity the agricultural activity is disappearing

more and more. Settlements in the vicinity are little by little included into build-up area and thus they cease to exist.

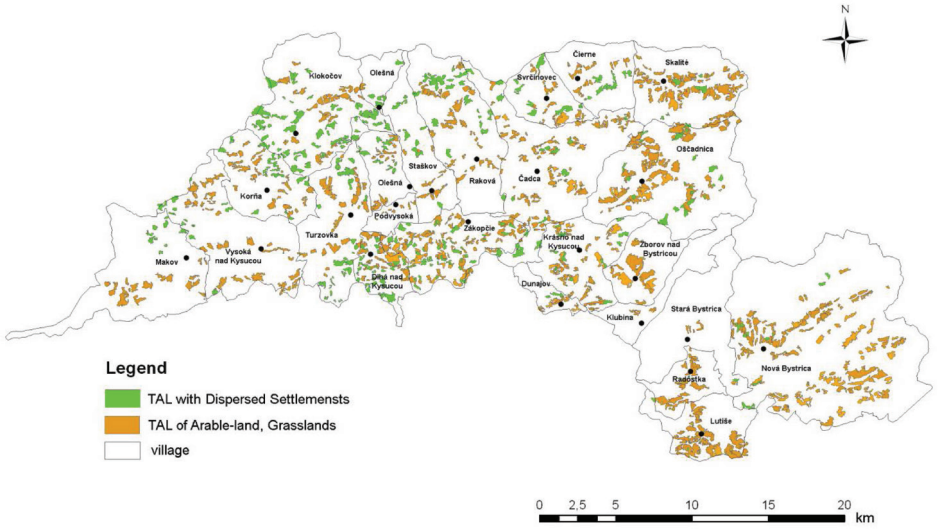

Figure 2. Extension of TAL in the region

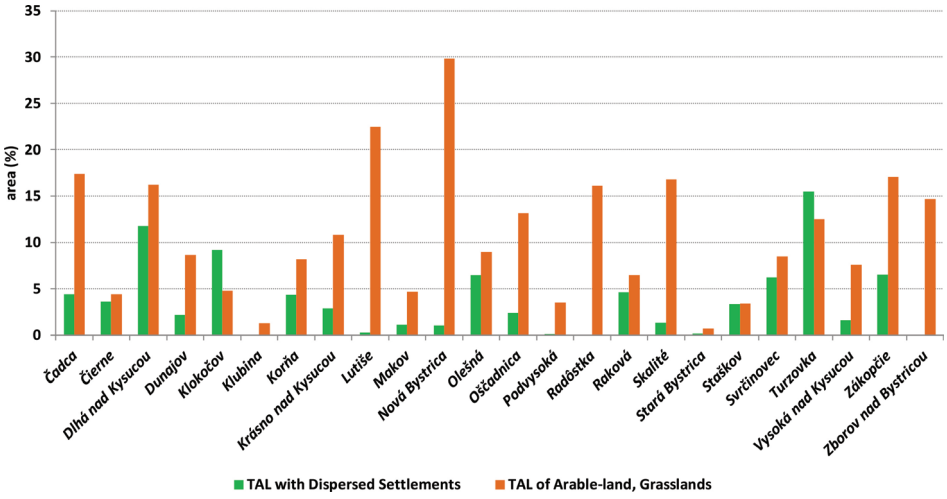

Figure 3. Representation of TAL in the individual cadastre units

In Kysuce, TAL area is enlarged into 9252 ha (22% of the TAL in Slovakia) which represents 12% of the whole area of Slovakia. There are two types

of TAL: TAL with dispersed settlement, comprising 2261.4 ha (3% of the area) and TAL of arable-land, grasslands, comprising 6990.3 ha (9% of the area). In 16 cadasters, TAL representation is between 10 – 15% (rarely 18%) from its overall surface area (Figure 2). Dominant representation is by TAL of arable-land, grasslands. They are represented in the whole area, but they cover the biggest part in Nová Bystrica (1180.5 ha), Oščadnica (770.9 ha), Zákopčie (504.9 ha) and in Čadca (475.4 ha). TAL with dispersed settlement has the highest representation in the central and northeastern part of the country, while in the eastern part and southeastern part it is scarce. This type is predominant mainly in Klokočov (471.5 ha), Raková (191.6 ha), Turzovka (194.1 ha) and in Zákopčie (192.5 ha) (Figure 3). Typical dispersed settlement is concentrated in higher areas of slopes or on mountain ridge areas of the individual mountain ranges, which surround central valleys. The most typical and the most preserved forms of dispersed settlement belong to Vysoké Javorníky (Zákopčie, Dlhá nad Kysucou and Turkov) and to Turzová Mts. (Klokočov, Korňa and Raková). These two regions are characterized by specific differences conditioned by the character of the regions and geomorphological characteristics. In Javorníky the settlement is mostly on the middle or higher parts of slopes and on mountain ridge areas. This area is characteristic by less indented big valleys. In Turzová Mts., the settlement is concentrated into the basins of the valleys or to the lower parts of slopes of the valleys. Narrow valleys did not allow for creation of more compact settlement forms and thus the settlements form groups of houses (hamlets/villages, farmyards).

The individual types of TAL are the most common outside the major settlements (river Kysuca, lower reaches of Čierňanka and Bystrica). The widespread ones are mostly in cadasters that extend or at least interfere into the surrounding mountain massifs. The lowest representation is in the regions with continuous forest vegetation or in the lower and middle parts of the valleys where these forms were erased during the era of collectivisation and unification of plots.

Degree of utilisation of the area

On the basis of mapping the incidence and structural characteristics of earmarked TAL types in the mapped area it was possible to obtain an image of the current structure of the landscape that was being formed during the evolution of the region. Based on this structure, means and intensity of utilisation of the area can be partially deduced. These data complement categories of the degree of utilisation of the earmarked TAL area (polygon) that are a sum of the whole character of the TAL mosaic in relation to utilisation and agriculture of the plots. We determined four degrees of TAL utilisation (Figure 4):

- ***Degree 1:*** Regular agriculture mosaics – more than 70% of plots in polygon are agricultured;

- ***Degree 2:*** Occasionally utilised or partially deserted grassy mosaics – 30 to 70% of plots in polygon are occasionally or regularly agricultured;
- ***Degree 3:*** Mostly deserted mosaics overgrown by non-forest woody vegetation (NFWV) – occasionally agricultured plots in polygon up to 30%;
- ***Degree 4:*** Not used and permanently deserted mosaics with a significant proportion of NFWV to woody vegetation.

The originally utilised mosaics of plots, where there were almost equally represented plots with arable land and permanent grassland stands (PGS) are nowadays disappearing. Traditionally only plots in the vicinity of the settlements (in dispersed settlements but also on the periphery of the build-up area) are agricultured. These areas are classified into the first degree of utilisation.

Generally the most represented are TAL areas with the second degree of utilisation. The absolute dominance belongs to PGS, whose utilisation is mainly concentrated in some part of the designated polygon (there the utilisation is more or less regular). In these mosaics, we can sporadically find a plot with arable land, but such utilisation is rare. More often we can find the incurrence of fallows, which are sporadically used for growth of cereals, root crops or various important forage crops are sowed.

More and more plots (even the whole areas) are unused, the proof being the data about the area belonging to the third or the fourth degree of utilisation (Figure 4). In regards to the overall evolution of the region, this trend will continue to the future.

The most utilised areas in the northwest Kysuce in Klokočov, Korňa, Olešná, Raková, Staškov, Vysoká nad Kysucou and Turzovka, in the northeast part in Skalité and Čierne and in southeast part in Lutiše and Radôstka. The proportion of polygons with higher degree of utilisation (1 and 2 together) represents 80% and more. Conversely, the less utilised TALs are in Riečnica and Harvelka (nowadays a part of cadaster area of Nová Bystrica), whose areas were evicted due to construction of Nová Bystrica dam, where the proportion of polygons with a low degree of utilisation (3 and 4 together) represents almost 100% and then in Zborov nad Bystricou, Dunajov and Krásno nad Kysucou where the proportion is above 50%.

Distinct position is occupied by the settlements with very low proportion of TAL. These TAL remnants are situated in the vicinity of settlements and then quite intensively utilised, which is the case of Podvysoká, or they are on less accessible or agriculturally less important places and then are less utilised, completely deserted even, which is the case of Klubina and Stará Bystrica. Their overall assessment in the scope of the whole region and the comparison with other cadasters is thus not objective.

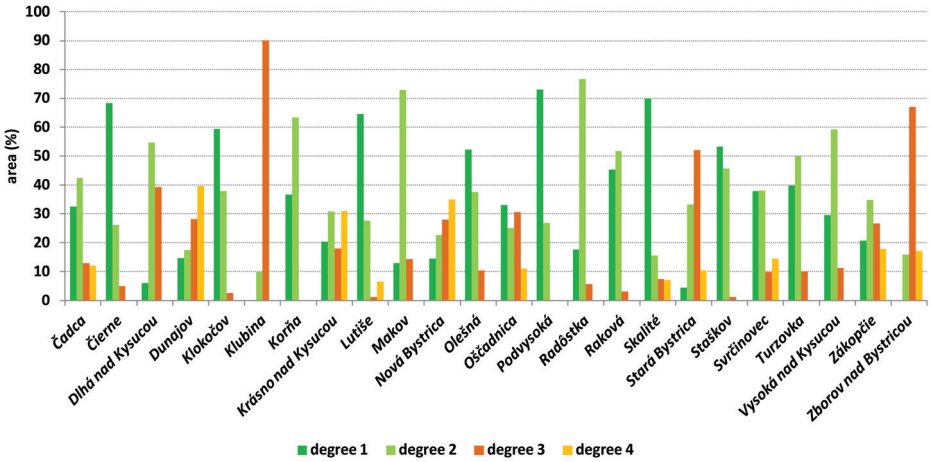

Figure 4. Degree of utilisation in the individual cadastre units

Dangers to the traditional agricultural landscape

TAL is endangered mostly by the move from the traditional utilisation of the soil to complete abandonment of the arable land, meadows and pastures, by being overgrown by woody vegetation, by taking the space for new construction in the scope of enlargement of the settlements.

The future of TAL based on comparison of the contemporary situation, potential incurrence and current management is endangered mostly by:

- unsuitable economical conditions for successful management of TAL (high input, low income, low profit, unsuitable competitive environment, lack of human resources, ageing of the population, younger generation not being interested, etc.),
- intensive pressure of the owners for a change in agricultural soil into construction site (the traditional architecture is disappearing),
- insufficient legislative protection of TAL
- insufficient research and monitoring of TAL.

Management and protection of TAL

It is crucial to ensure effective management with the aim to protect and maintain the utilisation of TAL. Nowadays, agricultural utilisation of TAL is neither effective, nor profitable or sustainable for the farmers in the long term. Although the current farmers do have a strong connection with the landscape, the efficiency of their work and economical indicators do not allow them in a long-term to utilise TAL ecologically and thus provide TAL itself with long-term sus-

tainable protection and maintenance. The strategy of protection and management of TAL is oriented to: 1. Optimal multifunctional utilisation and management of TAL and long-term sustainability in the area; 2. Preservation of biodiversity of the region through exerting agro-environmental system; and 3. Utilisation of TAL potential for the development of tourism.

For the management and TAL protection strategy, the following measures have been determined:

- in the area of the long-term sustainability and improvement of the human resources, in the area of management and protection of TAL by raising the awareness of the general public and supporting the positive approach of the citizens to TAL (strengthening the education and expert preparation aimed at local values, education of the younger generation to respect the country and its historical and landscape values);
- in support of suitable socio-economical conditions for the TAL management, tourism and regional development (strengthening of grant activities, support of tourism, support of traditional crafts);
- in support of farmers to develop and continue in their traditions, to create motivational environment for young people;
- to strengthen the promotion of socio-cultural country and natural values of TAL (publishing on web pages, information centres);
- to eliminate the endangerment of TAL under the influence of natural factors and under the influence of negative effect of man activities in the area;
- in the area of strengthening TAL protection in urbanisation documentation, in protection of nature and country;
- to support research and monitoring of TAL.

CONCLUSION

Nowadays, the dispersed settlement in Kysuce region stays almost in the same form and shape, but it does not fulfil its primary function – utilisation for living and agriculture. In the foreground are mostly summerhouses that could be an impulse for further development. Summer housing could have been seen here from the beginning of the 90s of the last century, but it gains its maximum intensity in the last few years. This phenomenon shows on many permanently uninhabited houses that serve as cottages in more than 4/5 of the cases. Favourable location in attractive and undisturbed country amidst a mosaic of meadows, pastures and forests causes an increase in short-term recreation and subsequently change from permanent to cottages and lodges.

However, in current developmental tendencies, this specific settlement can disappear therefore more attention should be paid, and solutions have to be found

to preserve this historical landscape structures that form dominant elements of landscape structure in these regions.

The suggestion of ecological management supports not only the protection of biotopes but also ensures the positive influence on health of local population and visitors by decreasing stress elements (from air, soil and water pollution) with providing services of ecologically healthy products. TAL is an important stabilizing element in agricultural landscape and its presence in these areas provides high biodiversity. It is imperative to classify TAL as significant landscape features and important local bio-centre due to its benefits for the society and the environment. For its preservation, it has to be included in the existing international regulations.

Knowing the current state, occurrence of TAL value is important mainly for understanding of its role for biodiversity and stimulation of measures for its preservation.

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