



The abandonment of traditional agricultural landscape in Slovakia – Analysis of extent and driving forces



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ABSTRACT

Traditional agricultural landscapes (TAL) in Slovakia represents a mosaic of unique small-scale arable fields and permanent agricultural cultivations such as grasslands, vineyards and high-trunk orchards, which did not change during the collectivization of agriculture from the 1950s to the 1980s. After the change to a market-oriented economy in 1989, the management of these valuable structures decreased rapidly. The aim of this study is to investigate the distribution of TAL in Slovakia and to analyse the driving forces behind their accelerated abandonment. The study was conducted at two scales, i.e. country-wide and in three case-studies. 3013 TAL polygons encompassing 44,464 ha were mapped from aerial photos, recording basic characteristics such as land-cover composition or degree of management. A detailed field study concerning the attitude of local people to the management of TAL was conducted in three case study areas. The results from the country-wide mapping shows, that 50% of the TAL area is regularly managed, 34% is partly abandoned, and 16% is abandoned. Abandonment occurs most intensively on steep slopes and on less fertile soils. The distance from settlements is important in the case of TAL with dispersed settlements and TAL with arable land and grasslands. Interviews at the case study level showed that financial profit is the main factor, which would motivate the local people to farm the TAL. Around 30% of respondents showed no interest in management. Local farmers identified the financial instruments in agriculture, in the form of unfavourable subsidies and the financial inaccessibility of modern tools and machinery as the main barriers in ideal management, together with an inadequate market and the weak support of local government. In addition, there are other cultural factors that play a role in their abandonment such as changes in the rural culture, attractiveness and diversity of other ways of living, lack of successors, health and age constraints, as well as a number of persisting problems regarding unresolved land ownership in some areas.

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1. Introduction

The disappearance of traditional agricultural landscapes is an ongoing process, accompanying the general trend of agricultural abandonment in Europe (Feranec et al., 2010; Gerard et al., 2010; MacDonald et al., 2000; Rey Benayas, 2007) and especially in post-socialist countries (Alcantara et al., 2012; Baumann et al.,

2011; Griffiths et al., 2013; Kuemmerle et al., 2008; Prishchepov et al., 2013). Traditional agricultural landscapes (TAL) are defined as those landscapes that have a distinct and recognisable structure which reflects clear relationships between the composing elements and which are of high significance for natural, cultural and/or aesthetical values (Antrop, 1997), or as landscapes with preserved traditional sustainable agricultural practises and conserved biological diversity (Harrop, 2007). In Slovakia, TAL are described as agricultural ecosystems that consist of mosaics of small-scale arable fields or permanent agricultural cultivations such as grasslands, vineyards and high-trunk orchards or early abandoned plots

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with a low succession degree (Dobrovodská et al., 2010). The Slovakian TAL are characterised by the following features: (a) preserved small scale structure of plot division; (b) presence of original forms of anthropogenic relief (balks); (c) unchanged land use during the collectivization of agriculture (1949–1989); (d) the use of some traditional agricultural technologies.

Traditional agricultural landscapes are valuable from an aesthetic, natural, cultural-historical, economic and social point of view (Baránková et al., 2011). The importance of the link between the traditional agricultural landscapes and biodiversity is recognised at the European level, referring to the term “High Nature Value farmland” under the current rural development regulation (EU/1257/99). Many of the habitats that are valued for high biodiversity across Europe are the direct result of traditional agricultural practises established during agricultural expansion (Bignal and McCracken, 2000; MacDonald et al., 2000) (for Slovakia see (Imrichová, 2006; Kanka and Štefunková, 2011; Kollár et al., 2012). Special types of anthropogenic relief forms created by long term cultivation, often offer unique habitats of regionally rare vegetation (Babicová and Gerhátová, 2011; Ružičková et al., 1999; Špulerová et al., 2015) or invertebrates (Dankaninová and Gajdoš, 2012; Košulič and Hula, 2013). The positive effect on landscape diversity and on visual quality was recognized by Slámová et al. (2013); Štefunková and Dobrovodská (2009).

Traditional landscapes are changing with increasing speed, and valuable cultural heritage is lost (Van Eetvelde and Antrop, 2004). Terraced agricultural fields, as a defining feature of Mediterranean traditional landscapes (Frederick and Krahtopoulou, 2000; French and Whitelaw, 1999; Grove and Rackham, 2003; Price and Nixon, 2005), have played an important social and economic role for many centuries. However, since the 1950s, these regions have been considered of little economic interest, and this has led to the abandonment of villages and farms. The resulting collapse of stone walls and agricultural terraces has caused erosion (Arnaez et al., 2011). In Greece, the abandonment of extensively cultivated land and traditional management practises, were caused by the economic collapse of agricultural activities by the mid-20th century and triggered a dramatic decline in numbers of farms and fields in terraced landscapes (Petanidou et al., 2008; Tzanopoulos et al., 2011). Continuous decline of extensively cultivated permanent grassland has been observed in most European countries, e. g. Switzerland (Schlup et al., 2013), Germany (Hoffmann et al., 2012), Norway (Ode Sang and Tveit, 2013), and Sweden (Cousins and Eriksson, 2008). In Central-Eastern Europe, the farmland environment is more extensively managed than in Western Europe and a large proportion of people still live in rural areas and generate different conditions for biodiversity (Cremene et al., 2005; Tryjanowski et al., 2011). The opening of the EU market to former socialist countries has triggered the abandonment of marginal land (Bell et al., 2009; Kuemmerle et al., 2008; Palang et al., 2006; Palang and Sooväli-Sepping, 2012) and has led to a decline in biodiversity, depending on small-scale production (Stoate et al., 2009).

The general development of the agricultural landscape in Slovakia is characterized by the following processes (Bezák and Mitchley, 2014; Izakovičová and Oszlányi, 2012; Kanianska et al., 2014): (1) Collectivization during the communism era: with the establishment of cooperatives (dominant farms), the grouping of small parcels into large intensively managed blocks, and the use of machinery and chemicals. This process had originated in the lowlands in the 1950s and moved later to the mountainous regions. (2) The change from a planning regime to a market economy after 1989, leading to a general decline in agriculture due to lack of governmental support, land restitutions and the changed lifestyle due to the introduction of democracy. (3) Entrance into the EU in 2004: the implementation of the Common Agricultural Policy

(CAP) significantly contributed to a widespread restoration of farming activities on large-scale fields. Before collectivization, the traditionally managed agricultural landscape covered more than half of the Slovak area. Fragments of TAL survived predominantly on steep slopes, less fertile soils and closer to the built-up areas (Lieskovský et al., 2013). The period of collectivization was followed by an extensive phase of agricultural abandonment, particularly during the transition to the market-oriented economy. Overall, the TAL area was reduced to less than 1 percent of Slovakia (Špulerová et al., 2011). Facing the disappearance of traditional agricultural landscapes in Slovakia, we wanted to collect information about their present state, distribution, and the driving forces behind their accelerated abandonment after the transition to a market-oriented economy. Our aims were to: (1) map the distribution and degree of management of TAL in Slovakia, (2) analyse the geographical pre-conditions of abandonment (slope, soil fertility, accessibility, isolation), (3) analyse the driving forces behind the TAL abandonment in three case studies areas.

2. Methods

2.1. Country-wide mapping of traditional agricultural landscape abandonment rates

A country-wide inventory of TAL was performed for all of Slovakia through a combination of methods using both visual interpretations of aerial photos and field surveys (Dobrovodská et al., 2010). The TAL polygons were identified on aerial photos (taken in 2007) according to the following criteria: (1) land use did not change since the time of agricultural collectivization (pre-collectivization land use was identified from historical topographic maps), (2) polygons are not overgrown by trees, e.g. less than 50% woody vegetation cover, (3) polygon area is larger than 5000 m², (4) mosaic structure consist of more than 5 fields. For each polygon, the following characteristics were registered: intensity of management, proportion of land cover classes, percentage of non-forest vegetation cover, shape and position of land parcels towards the slope and the presence of visible forms of anthropogenic relief. The intensity of management was evaluated based on the coverage of the managed plots within the site. Polygons were categorized as follows: (1) Regularly managed mosaic (more than 70% of managed plots within the site), (2) Occasionally managed or partly abandoned mosaic (30–70% managed plots in the site), (3) Mostly abandoned mosaic, overgrown by shrubs and trees (less than 30% of managed plots in the site).

Based on the presence of characteristic land use elements, we distinguished four classes of TAL (Špulerová et al., 2011): 1) TAL with Dispersed Settlements, (2) TAL of Vineyards, (3) TAL of Arable-Land, Grasslands and Orchards, (4) TAL of Arable-Land and Grasslands (Fig. 1).

2.2. Analyses of geographical factors affecting abandonment

Based on field research, the literature inventory and considering data availability, we chose four geographical factors with potential impact on TAL abandonment: slope steepness, soil fertility, accessibility and isolation. Slope steepness was derived from a digital elevation model, which was interpolated from the civil contour maps at a scale of 1: 10,000, provided by the Geodetic and Cartographic Institute in Bratislava. Soil fertility was interpreted from a national soil map of Bonited Pedo-Ecological Unit data according to Džatko (2002). Soil fertility was calculated as a function of soil type, slope steepness and aspect, soil depth, skeletal content and climate region, and is expressed in terms of soil production potential

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