



Land-use and land-cover changes in rural areas during different political systems: A case study of Slovakia from 1782 to 2006



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ABSTRACT

The paper analyses the period from 1782 to 2006 divided according to the existing political systems in three rural study sites of Slovakia. Two long, monarchy (I.LMP) and revolutionary (II.LRP), and one short new age (III.SNP) periods are compared. The magnitude of land-use and cover changes induced by related driving forces during the different historical periods are also analysed. Three different study sites were selected: cadastre of Král'ov Brod (KB), mountain cadastres: Očová and Dúbravy (OD), Liptovská Teplička (LT). Spatial data derived from historical maps were used in comparison to recent data obtained using Remote Sensing technology. The results showed that the landscape of all three sites has undergone significant changes in land-use and cover during the 224 years. From the long-term point of view there were two main trends observed. The first was significant permanent grassland conversion into arable land at KB where permanent grasslands decreased from 52.7% in 1782 to 0.7% in 2006. Gradual afforestation and permanent grassland conversion to forest land was observed at LT where forest land increased from 67.7% in 1782 to 83.7% in 2006. During the I.LMP period, demographic trends and settlement pattern supported by effective land-use policy were the dominant driving forces. Similarly these driving forces were identified as the most important also for the III.SNP period. But contrary to the I.LMP, driving forces of the III.SNP caused more negative effects (land abandonment) in mountain rural LT region where the current land-use policy seems to be insufficient. Land-use changes during the II.LRP were mostly due to technological development.

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Introduction

Cultural landscapes are the result of the interaction between humans and nature (UNESCO, 2011). Antrop (2006) considers landscape as a synthetic and integrating concept that refers both to a material-physical reality, originating from a continuous dynamic interaction between natural processes and human activity, and to the immaterial existential values and symbols of which the landscape is the most significant. The European Landscape Convention (Council of Europe, 2000) recognised landscapes as a part of the European cultural heritage and key components of local, regional and national identities. Different landscapes can be recognised including rural. The rural landscapes of Europe constitute the immediate daily surroundings of many people and are particularly important in terms of territory. Development of rural areas depends on natural conditions, but their development trends could be significantly divergent (Spulerova et al., 2010).

In Europe, several breaks have occurred in the development of cultural landscape. Many completely new landscapes were created during the population explosion in the middle ages, causing important land reclamation activities. The newly created landscapes were then integrated and developed. An increase in the speed and magnitude of changes could be observed since the 18th century (Antrop, 2005).

Modern society increasingly utilises landscapes in a great variety of ways and for many purposes (Vos and Meeks, 1999). Changes varied from the spatial, temporal and processing point of view (Serra et al., 2008; Krausmann et al., 2003). Land-use changes are non-linear and are associated with other societal and biophysical system change (Lambin and Meyfroidt, 2010). Various actors and forces trigger a specific rate of change (Schneeberger et al., 2007). Various driving forces are identified by researchers as major types: socio-economic, demographic, political, technological, natural, and cultural driving forces (e.g. in Zondag and Borsboom, 2009; Brandt et al., 1999).

Rapid and large-scale nature changes i.e. sweeping changes in agricultural practices, the decline of agricultural activity in some regions, urban sprawl, the development of road and rail networks,

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as well as the pressure of tourism and leisure activities (Feranec et al., 2000; Jongman, 2002; Van Eetvelde and Antrop, 2004) have taken place and have resulted in land-use and land-cover changes. Given this human influence, the recent period has been called the Anthropocene Age (Slaughter, 2011). According to Kondratieff, economies follow the path of long-term dynamic cycles or waves. A long wave lasts for 40–60 years, and consists of a period of rapid economic growth, followed by stagnation or depression, creating the dominant sociotechnical landscape for the next wave (Wilenius and Kurki, 2012).

But also history has recorded many landscape changes which resulted from the adopted political systems, specific laws and rules for landscape management. Ancient landscapes became fragmented and disappeared gradually while new ones have emerged.

The acceleration has spurred renewed concerns about the role of land-use changes in driving losses in biological diversity, soils and their fertility, water quality and air quality (Reid et al., 2000). Several authors highlight the impact of agricultural intensification on the rural landscape (Stoate et al., 2001; Hersperger and Bürgi, 2009), connected also with agricultural diversification. For centuries, humans have been using the earth's surface to produce food through agricultural activities. At present, new demand for land, biomass production for energy (Kanianska et al., 2010, 2011), carbon plantation and the global food market, are very significant. Through changes in agriculture and forestry practices, landscapes have suffered rapid and often irreversible changes (Jongman, 2002). The reason is extensive land abandonment (Mac Donald et al., 2000) and marginalisation of agricultural land (Fry and Gustavson, 1996; Václavík and Rogan, 2009) although there are some policies preventing these negative factors in mountain rural areas, e.g. European Landscape Convention (Council of Europe, 2000). The global context is important for future European land-use (Eickhout et al., 2007) and strategies for conservation and management must be developed (Calvo-Iglesias et al., 2006). Sustaining ordinary traditional landscapes based upon rural economies such as agriculture and forestry demands an adapted policy and supporting actions (Antrop, 2006).

Land relief in Europe shows great variation within relatively small areas. Europe is one of the most intensively used continents on the globe, with the highest share of land (up to 80%) used for settlement, production systems (including agriculture and forestry) and infrastructure (EEA, 2007). In the EU-27, rural areas (predominantly rural and intermediate regions) represented 91% of the territory and 59% of the population in 2007. Rural areas are therefore particularly important in terms of territory (EU DGARD, 2010).

Slovakia is largely located in the mountain territory of the western Carpathian arch. The mountain regions cover more than 55% of the total land territory. In 2007, the Slovak rural territory represented 86% of the total land area and the Slovak rural population represented 41% of the total population. In 2010, population density within Slovakia was 110.8 persons per km² (SOSR, 2011).

Slovakia as a small European country was mostly during its history part of a larger political formation and experienced different political regimes. Its territory has undergone many changes during history and as a part of Central Europe its landscape is much more diverse than Western European ones (Palang et al., 2006). Nowadays, Slovakia is one of the successor countries of the Austro-Hungarian Empire. From 1918 to 1938, Slovakia was part of the market-oriented, capitalist Czechoslovakia, which turned as a part of the east and central Europe into a socialist centrally planned system in 1948 and then back into a market-oriented economy in 1989. Thus Slovakia is an example of a present-day state that has experienced significant changes, not just through industrialisation,

like in other countries, but above all in response to a number of serious political shifts. This example can help to identify and explain a knowledge gap as to how political system changes have influenced land use. How was the process of transition in rural Slovak areas and how was the magnitude of the land-use and cover changes during the politically and economically eventful history of Slovakia? What were the main trends and driving forces of these changes? Analysis of long term land-use changes and their comparison with the recent period helps us to understand the links between land-use choices, their potential impact and the quantification of this impact.

This article analyses spatial and temporal land-use and cover changes focused on selected rural areas. The aim of the paper is to assess long and short term recent land-use and cover changes from 1782 to 2006 in three selected rural cadastres located at different natural conditions of Slovakia using historical maps and high-resolution satellite data layers. The nature of the changes induced by different driving forces during different periods in history and related political systems is discussed and the causality of these changes is examined. Such analysis allows us to learn from the past and discover the integrity between long and short changes.

The historical background of Slovakia

The history of Slovakia reaches back to the 5th and 6th centuries when Slavic tribes migrated into the region south of the Carpathian Mountains. Despite the fact that 80% of the territory was covered by forest vegetation naturally, there were suitable conditions for agricultural development. Slavic tribes established villages and developed an agricultural economy in the Middle Danube Basin. In the middle of 9th century Slavs from Bohemia, Moravia and the Danube region joined to form the Great Moravian Empire. In 10th century Magyars, a semi-nomadic people from northeast, invaded the Empire and established the Hungarian Empire. In 16th century, after the Ottoman Turks conquered the southern section of its kingdom, Hungary became part of the Habsburg Monarchy. Maria Theresa (from 1740 to 1780) with her son Josef II (from 1780 to 1790) introduced reforms leading to socio-economic development of the Empire including land cadastres. In 1848, the wave of revolutions which swept across Europe, reached the Austro-Hungarian Empire. The achievements of the revolution produced economic, social and intellectual effects, which promoted the gradual adoption of capitalism. The Austro-Hungarian Compromise of 1867 established the Dual Monarchy of Austria – Hungary. After the collapse of the Austro-Hungarian Empire and the end of the World War I in 1918, the First Czechoslovak Republic (1918–1938), and then the Second Czechoslovak Republic (1938–1939) were established. During World War II (1939–1945) the Slovak State was set up. The political model and culture introduced by one dominant political party deliberately favoured a pattern of centralised leadership with a strong ruler. This one-party Slovak State ended in 1944, when democratic and communist forces organised an armed revolt (Ivantsyn, 1999). In 1948, few years after World War II, dramatic changes like nationalisation of land and private estates took place. The communist period lasted from 1948 to 1989 in the different political-administrative forms, the Czechoslovak Republic (1945–1960), the Czechoslovak Socialist Republic (1960–1990), the Czechoslovak Federative Republic (1990–1992). In 1989, land use again began to change dramatically, this time as a result of the Velvet revolution and establishment of parliamentary democracy. In 1993, the Czechoslovak Federative Republic split into two independent republics, the Slovak Republic and the Czech Republic. Slovakia joined the European Union in 2004.

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