

ANALYSIS OF THE IMPACT OF SETTLEMENT PATTERNS ON LANDSCAPE PROTECTION IN TWO DIFFERENT EUROPEAN RURAL AREAS

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Abstract

The colonization occurred at large scale during the past centuries has contributed to shape the image currently perceived from a landscape. The settlement dynamics are especially interesting, having played an important role. Several traces of extinct settlements and their access routes are usually still visible in many today's European landscapes. Aim of this study is to evaluate the impact on rural landscape of different settlement patterns and relevant accessibility routes. Two different European rural areas, located in the Czech Republic (Silesia region, "Frýdek-Místek" area) and in Italy (Basilicata region, "Vulture" National Park) were analysed and compared. GIS-supported statistics were used to investigate the main landscape components, focusing on the reasons at the basis of their formation and successive decline due to war, epidemic or economic reasons. Main results obtained have shown that these important historical legacies are increasingly disappearing in both the study areas. While the increase of modern farming activities and general oblivion in public awareness is the main reason in the Czech villages, the settlements in Basilicata region are currently endangered by environmental risks. In both cases there is a serious loss of the cultural heritage of the rural landscape, with consequent reduction of its public recreation opportunities.

Key words: extinct settlements, rural landscape, village accessibility

Introduction

The memory of a landscape is endless, and although nature itself helps with self-regulating abilities, the steps of our ancestors who have worked can be found there, witnessed by the transformation of the landscape, as we know it nowadays. The analysis of rural land modifications, as well as the wider environment and landscape context in which they take place, is important in order to understand the profound transformations connected with human intervention and natural events (Statuto et al., 2017; Picuno et al., 2017).

Changes in land use and management have indeed led to the degradation of several cultural landscapes in some European rural areas, with relevant consequences for local populations, landscape functionality and the maintenance of ecosystem services (Statuto et al., 2016). In the Czech Republic, the originally forested area was disturbed by the arrival of the first Slavic settlers dealing with agriculture. They first settled along large rivers and streams, and later moved to less suitable locations (Pokladník & Roudný, 1994). In Italy, on the other hand, natural areas have decreased during the first half of the 20th century, giving more space to the agricultural land, due to some agricultural reforms and relevant socio-economic changes, which have also led to change the agricultural activities. In this way, in some internal areas of Southern Italy, the cereal crops often replaced the pastures, with consequent modification of the landscape structure over the time. However, in

the recent years, a common opposite phenomenon widespread in the same areas occurred, mostly evident in some Italian southern regions, as the Basilicata region (Statuto & Picuno, 2017). Here, many agricultural areas were abandoned due to socio-economic and demographic reasons, with their consequent re-naturalization and susceptibility to natural hazards. This phenomenon is currently more frequent, due to the loss of the “*control action*” played by the presence of humans who, living in constant contact with the agricultural production, developed a synergetic function of close proximity to the extra-urban land. Rural buildings - spread all over rural areas for farming, storage and processing of agricultural products, and constituting, at the same time, housing for the farmer and his family - have been, and still represent, a unique way by which humans have populated, in harmony with the natural elements, the agricultural land. Joining the primary production needed for human nutrition with the control and care of rural land, has strongly influenced the agricultural environment and the visual perception of its landscape (Picuno, 2016). Aim of the present study is the evaluation of the impact on a rural landscape of different settlement patterns and relevant accessibility routes in two different European rural areas, located in the Czech Republic and in Italy. These two study areas have been selected to show differences, as well as similarities between the different ways chosen by our ancestors to settle the territory.

Material and methods

The study area that was analysed in the Czech Republic is the “Frýdek-Místek” area in the Silesia and Moravia regions (209 km²). The foothills of the Beskydy Mountains, where the city of Frýdek-Místek is located, in the medieval village with less intensity, were formed. Apparently the rivers Ostravice and Olše represented a border area separating two major settlement centres, namely the Moravian valleys inclining to the Danube and the Silesian-Malopolsk region (Adamec, 2014).

The Italian study area is the “Vulture Regional Park”, located in Basilicata Region (195 km²). Here, the situation appears quite different. In the area close to the city of “Rionero in Vulture”, the original settlement is spread over two hills around 656 meters above sea level, and the territory characteristics are the direct consequence of the past volcanic activity of Mt. Vulture (Principe & Giannandrea, 2006). Its landscape was positively influenced by the activity of the extinct volcano, both from an agricultural and environmental point of view. Indeed the fertile soils deriving from the volcanic activity and land morphology allowed the development of a rich variety of valuable crops (in particular olive groves and vineyards) and several types of natural areas which have been protected by the European Commission. This area is also conditioned by the massive and constant management of the territory as, for example, with the chestnut cultivation. In this case, the control of the land by man is almost total, while it is possible to admire a nearly total naturalness on the summit area, dominated by forests of Turkey oak and beech woods, having a strong tourist appeal. During the last seven centuries, the *Rionero in Vulture* rural landscape has been modified by at least seven earthquakes (Gizzi & Masini, 2006).

The comparative analysis has been performed by implementing some GIS-supported programs (*i.e.*: ArcMAP; QGIS), while the “STATISTICA-12” software was used for a *Principal Component Analysis* (PCA). The slope analysis and the reclassification into 4 categories: 0°-20°, 20°-40°, 40°-60°, 60°-81(201)° was used within a GIS to explain the typical distribution of the road network in both regions. On the other hand, the implementation of the PCA method (Daffertshofer et al., 2004) was performed, considering the following parameters: area, altitude, population, density and origin. As a case, all cities were used both on the Italian territory (self-

reliant PCA for the municipalities of: Rapolla, Barile, Rionero in Vulture and Atella) and Czech (self-reliant PCA, in which the municipalities of: Frýdek - Místek, Baška, Pržno, Metylovice, Frýdlant nad Ostravicí, Pstruží, Čeladná, Kunčice nad Ondřejníkem, Frenštát pod Radhoštěm and Trojanovice were considered).

Results

The route nets which were present in the 19th century are still evident in both areas. The first result coming from this comparative analysis is that, from a long-term point of view, the road net system in both cases has not disappeared, acting on the contrary as a base on which the road net system has increased according to the development (Fig. 1).

Moreover, the classification of the study areas into four parts according to the slope (Fig.2) enabled the evaluation on how accessing the landscape goes hand in hand with the altitude and natural conditions, the highest parts of mountains being forested.

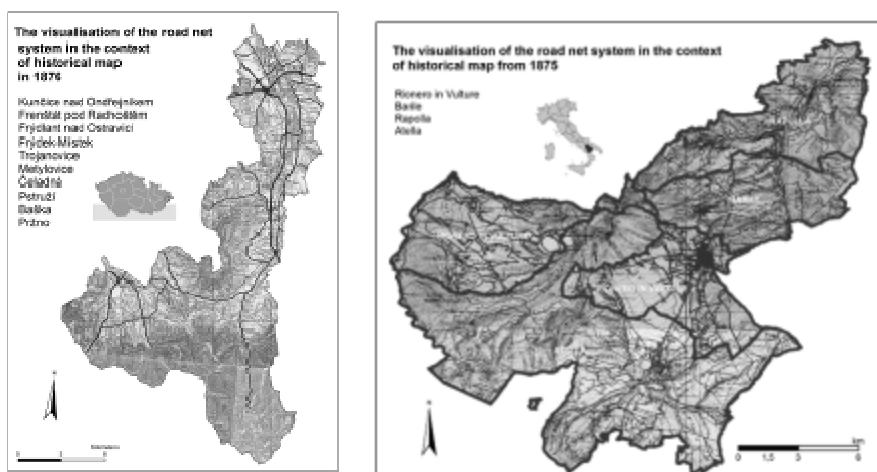


Fig. 1: road net system in 1876 in the Frýdek-Místek area (left) and in 1875 in the Vulture area (right)

During the processing of the PCA method, according to the analysis of the correlation matrix of own numbers and scree plot, the results showed that the first and second major components explain a total of 87.6% (I.: 54.22% and II.:33.38%) of the original scattering of the variables from the survey in the Czech Republic and 76.3% (I.:41.29% and II.:35.04%) of the original variance of the survey variables in Italy. In both countries there is a correlation with origin, the cities in Italy being connected with their year of foundation. The trend is that the larger villages are those who have developed more recently. On the other hand, in the Czech Republic, the origin has no effect on size, but the older villages are, the lower they are distributed (Daffertshofer et al., 2004). Italian cities that were founded later are now larger in size, whereas in the Czech Republic there is no correlation with the current population in 2017 (Fig. 3).

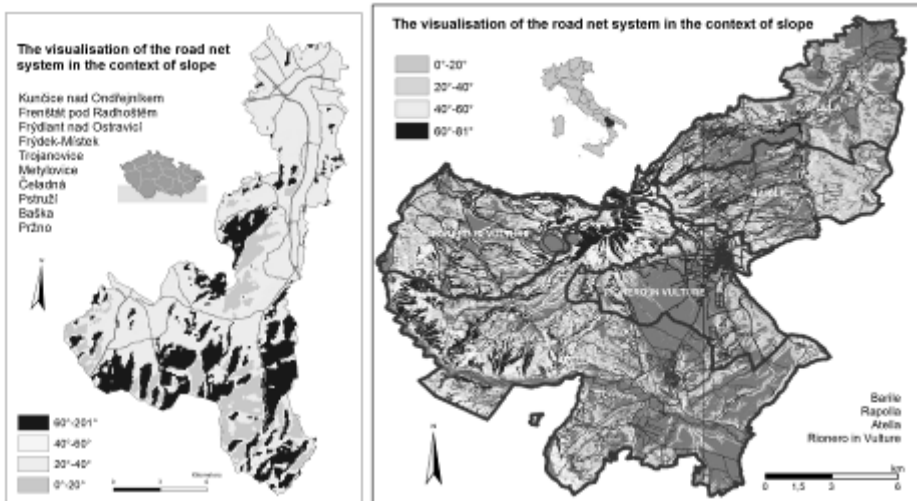


Fig. 2: Current road net system correlated to slope in the Frýdek-Místek area (left) and in the Vulture area (right)

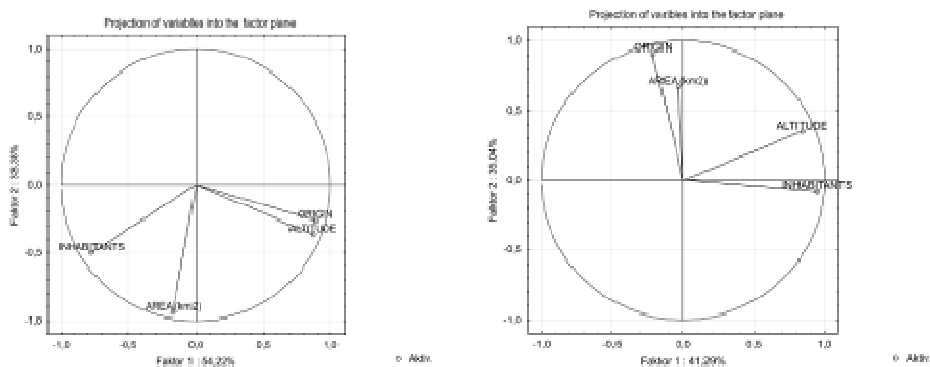


Fig. 3: Analysis for the Frýdek-Místek (left) and for the Vulture area (right)

Discussion

There are some connections between the two analyzed areas, such as the origin of the cities, which were mostly built during the colonization in the 11th until the 18th century. Similarities may be also found in connection to war conflicts which were destroying the natural assets. Concerning environmental risks, in Basilicata the most serious problems are earthquakes, which can be destructive for huge areas. The Czech area is stricken mainly by floods, fire and dry, which may be a serious problem in the future. The distribution of road network for many centuries did not change significantly. This happened – other than economic reasons - since the first layout of land was based on cultural identity heritage, the owners having not allowed to change the traditional arrangement of their forefathers land. Historical development by accessing the landscape was dealt with by Hrůza (2013), who also applied historical practices to the current conditions. According to his research, the road once built seems to be a permanent construction in the landscape and the forest ecosystem (Hrůza, 2014).

Conclusions

In spite of a different geographical position of the two considered countries, the process of colonization was similar. In the past, the soil with the settlement close to the Vulture volcano provided also high yields of wine and olives. The tendency in the Czech Republic was to seek out the most fertile areas with a great production of crops and pasture, according to the region of Beskydy. The role of the economy and long-term disposition was remarkable, so the distribution of road nets did not change for centuries in both countries. Some differences in creation settlements pattern were anyway shown by the PCA analysis that was performed. The connection between distribution of older Czech villages and their placements was found out, while younger Italian villages showed a tendency to have bigger areas of settlement.

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Shrnutí

Šetřené lokality měly, i přes velmi odlišnou geografickou lokalizaci, obdobný proces kolonizace. V dohledatelné historii bylo osídlení v blízkosti sopky Vulture motivováno především možností dosažení velkých výnosů pěstovaných oliv a vinné révy. Ve sledovaných lokalitách České republiky byla přítomnost optimálních podmínek pro pastvu hlavním parametrem výběru oblasti pro osídlení. Ekonomické hledisko a dlouhodobá dispozice krajiny nepředstavovaly zásadní důvod pro změnu rozložení sítě cest, a to ani ve sledovaném měřítku staletí. Byly však stanoveny také odlišnosti v charakteru osídlení. Např. metodou PCA byl zjištěn vztah mezi rozšířením dříve založených českých vesnic a jejich umístěním z hlediska nadmořské výšky. Naproti tomu, pokud tyto vesnice vznikaly v pozdějších dobách, tato metoda poukázala na tendenci zakládat italské vesnice o větší rozloze.

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