

# Land Use Development in Slovakia from the 17<sup>th</sup> to the 20<sup>th</sup> century: Case Study Area of Bojnice

Marián ŽABENSKÝ, Michala DUBSKÁ

Department of Culture and Tourism Management, Faculty of Arts,  
University of Constantine the Philosopher in Nitra, Stefanikova 67, 949 74 Nitra, Slovak Republic  
mzabensky@ukf.sk, mdubska@ukf.sk

## 1. Introduction

Landscape as a complex entity is currently of interest to many scientific disciplines. Archetypes preserved in the landscape help us to analyse the development of historical and current landscape structures. Land use structure on the territory of present-day Slovakia experienced significant changes in the past. These were influenced by various factors within multiple dimensions. Žigrai (1997) identified two universal dimensions – space and time, which are complemented by socio-cultural, economic, technical and environmental dimensions. We analysed the process of land change in the Slovak town of Bojnice. There are many historical landscape structures, which have already ceased to exist or are gradually disappearing under the influence of socio-economic development and other aspects.

## 2. Objectives

Our aim is to analyse and evaluate the development of the cultural landscape in Slovakia over the period from the 17<sup>th</sup> to the 21<sup>st</sup> century on the case study of the town of Bojnice and its environs. The paper includes a land use/land cover analysis for different historical periods (e.g. feudalism, capitalism, socialism ideology, globalized economy). Particular attention was paid to the identification and description of the variety of factors determining certain land use changes.

## 3. Methodology

We focused on the analysis of land cover and land use, with an emphasis on the review of land use classes. The results are interpreted on the background of the landscape's historical development. The following land use classes were analysed in the research: forests, grass lands, arable land, permanent cultures and built-up areas. The issue of land use and land cover has already been studied by Bičík, Jeleček, Štěpánek (2001); Feranec, Ořahel (2001); Ořahel (2004); Pucherová (2004); Jeleček, Bičík, Štych et al. (2012) and others.

We acquired and processed data from multiple different sources. **Historical and current cartographic works** represent a significant source of information. These particularly include the maps of the First Military Mapping (Joseph period, 1763–1785), the Second Military Mapping (Francis period, 1803–1869), the Third Military Mapping (1869–1887) and maps prepared by the Czechoslovak Military Topographic Institute over the years 1953–1957. We mapped the status of the case study area for the following periods: 1882–1884, 1845, 1882 and 1956. We also used maps published by the Geodesy, Cartography and Cadastre Authority of the Slovak Republic in 1992 and Google Maps

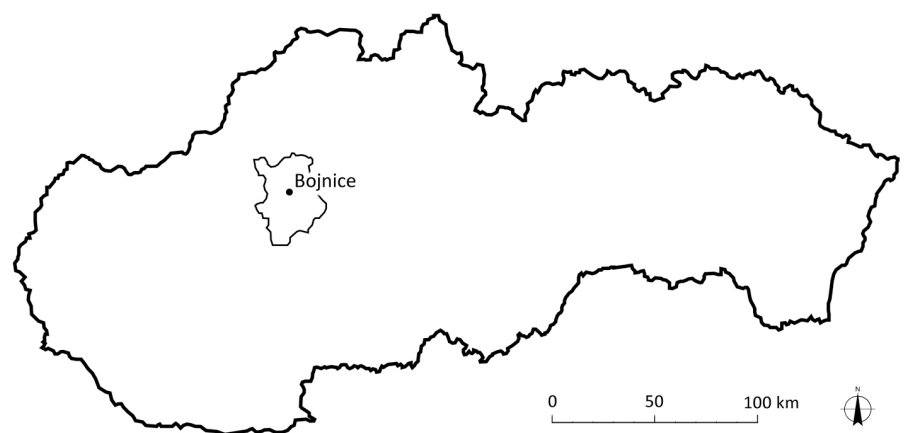


Fig. 1 – Studied area, located in the Slovak Republic

(2009) based on aerial photographs of the territory of the Slovak Republic.

**Historical documents, literature and other works** provided us with other interesting data. We worked mainly with urbarial inventories of the Bojnice domain (these are historical materials documenting the number of houses, buildings, land, property, etc. in a certain period). We analysed documents from the years 1614, 1647, 1752 and 1869. They contained information about the size of utilized areas, the structure of wood and crop coverage or the amount of livestock.

**Historical artwork** is also an important and helpful source of information. These works make it possible to perform spatial identification and localization of certain landscape archetypes and historical landscape structures. On the other hand, they have to be analysed carefully; because the perception of reality on the part of the authors from past centuries was sometimes inaccurate (they often added inauthentic or modified elements that actually didn't exist in the area). Therefore they can be only partially used for the purposes of the reconstruction and evaluation of historical land use patterns. In our research, we analysed two works of Johann Ledent, which captured the Bojnice town and its surroundings in 1641 and 1642.

Land use analysis in the 20<sup>th</sup> and the 21<sup>st</sup> century is based primarily on **historical and contemporary photographs**. An information database was created on the basis of data obtained through analysis and comparison of historical cartographic works and urbarial inventories. Interesting results showed up

Table 1 – Geomorphological units in studied area. Author: M. Žabenský (2012)

|              |                                    |                   |
|--------------|------------------------------------|-------------------|
| System       | Alpide belt                        |                   |
| Sub-system   | Carpathian Mountains               |                   |
| Province     | Western Carpathian Mountains       |                   |
| Sub-province | Inner Western Carpathian Mountains |                   |
| Area         | Fatra-Tatra region                 |                   |
| Unit         | Strazov mountains                  | Upper Nitra Basin |
| Sub-unit     | Mala Magura mountains              | Prievidza basin   |

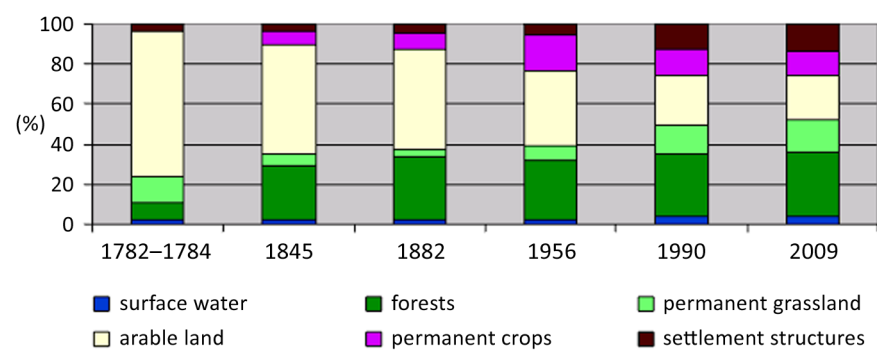
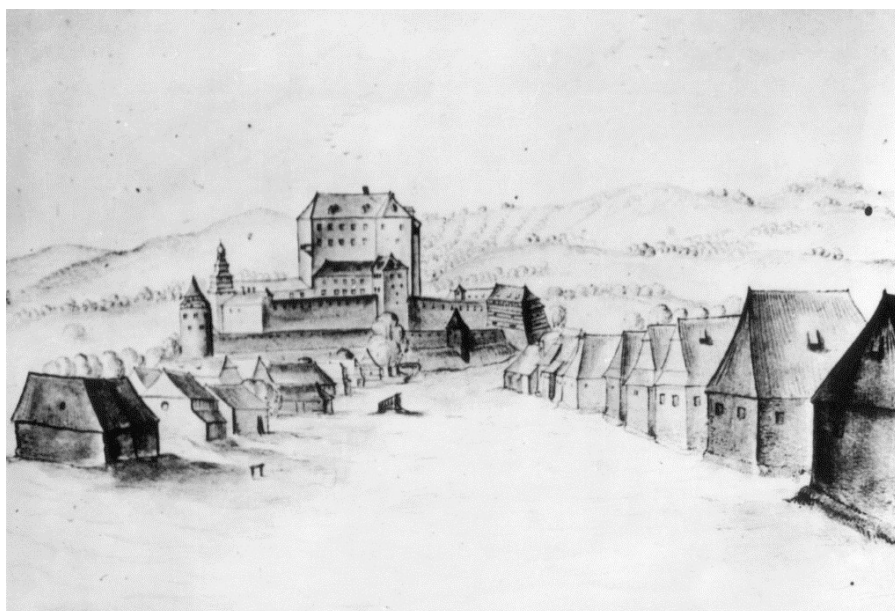


**Fig. 2** – Land use classes in the studied area (percentages and graphical display).  
Author: M. Žabenský.

**Table 2** – Land use classes in the studied area

| land use \ year    | 1782-1784 | 1845  | 1882  | 1956  | 1990  | 2009  |
|--------------------|-----------|-------|-------|-------|-------|-------|
| surface water      | 1.1%      | 0.7%  | 1.2%  | 0.7%  | 2.1%  | 2.1%  |
| forests            | 8.5%      | 27.1% | 29.5% | 31.0% | 31.7% | 33.4% |
| grass land         | 13.8%     | 6.4%  | 5.0%  | 6.8%  | 15.1% | 16.2% |
| arable land        | 72.4%     | 54.8% | 48.8% | 37.7% | 24.4% | 21.9% |
| permanent cultures | no data   | 6.7%  | 10.9% | 18.2% | 13.6% | 12.1% |
| built-up areas     | 4.2%      | 4.3%  | 4.6%  | 5.6%  | 13.1% | 14.3% |



View of the castle and surrounding orchards in 1641 (author: J. Ledent) and a view of the castle in the 18<sup>th</sup> century.



View of the castle in 1856 (author: Brodský) and a view of the square and the forest succession in the early 20<sup>th</sup> century, after the reconstruction of the castle.



View of the town of Bojnice in the middle of the 20<sup>th</sup> century (Prievidza town in the foreground). A view of the square in 2009.

**Fig. 3** – Views of the town of Bojnice and the surrounding landscape between the 17<sup>th</sup> and the 20<sup>th</sup> century

in the multi-temporal analysis of transects of cultural landscape layers. Because we lack maps of the 17<sup>th</sup> century, we used data from urbarial inventories from 1614 and 1647, artworks by Ledent and the data recorded in trade agreements listed in the Bojnice municipal book.

The results are also presented in a 3D model of the studied area in the 17<sup>th</sup> and the 19<sup>th</sup> century, using 3D MAX and SketchUp programs. Models are based on cartographic works, urbarial inventories, historical paintings and photographs. They display only those objects and structures that could have been verified and precisely located.

#### 4. Study area

The object of this research is the cultural landscape on the territory of the Bojnice town. It is part of the administrative district Prievidza (Fig. 1), located in the South-Eastern part of the Trenčín Region. The studied area was defined in accordance with the historical development of the Bojnice dominion, with an emphasis on human activity, geomorphological modelling of natural and administrative boundaries.

#### 5. Geographical situation

Studied area is located on the ruins of Mesozoic sediments of Strážov Nappe (especially slopes) and on Paleogene marine sediments that fill a large fault from younger Tertiary period. The fracture passes through the area. Due to thermal and mineral springs at its edges, travertine hills were formed there.

The territory of Slovakia is located in the temperate climate zone. The climate of Bojnice town is warm, slightly humid, with mild winters. The average annual temperature is 8–9 °C. Average annual rainfall oscillates between 650 mm to 700 mm. Most precipitation falls in the summer in the form of short-term storms. Rather warm climate is affected by a wall of mountains and a southward oriented valley of the river Nitra. The studied area belongs to the Nitra river basin. Most of the water sources were captured at their springs. Today, they are mainly used as sources of drinking water (water supply). The Dubnická stream emerges under the Sutov saddle at an altitude of 592 meters. The Teply Potok stream rises in the spa area and flows into the Nitra River. Due to thermal water, some subtropical and tropical plant and animal forms exist in the area.

Thermal springs of Bojnice with a temperature of 28–48 °C were the primary impetus for the development of spas in the town. Morphological segmentation of Bojnice area influenced the extension of two phytogeographical elements – thermophilic and xerophilous Pannonian species, mixed with Carpathian submountain and mountain species. Penetration of thermophilic species from the Danube region is a result of the openness of the whole area to the south and the presence of warm limestone and dolomite substrates in certain areas. Brown rendzina and gley soils can also be found in the area of Bojnice.

#### 6. Social and economic background

The first settlement in the area was associated with the existence of travertine mounds. Along with thermal springs they created suitable living conditions for prehistoric Neanderthal populations. Warm and frost-free water springing up on a travertine in the area of today's castle attracted plentiful wildlife. All of these

aspects formed proper preconditions for a long-term persistence of Neanderthals in the area. The castle area was later colonized by people of the Lengyel, Lusatian and Dack cultures (2600 B.C. – 0). An existing fort built by people of Puchov culture was later used by the Slavs who came to the territory approximately in the 6<sup>th</sup> century A.D. In the 9<sup>th</sup> century, Bojnice became a part of Nitra Principality. The locals were known as producers of tar, iron products and pottery.

The first written record related to the area is available in the document known as Zobor Letters from 1113. There is a note about the sub-castle area of Bojnice „de suburbanis Baimoz“ and the first mention of the existence of baths „fervidus Fons“ (meaning a hot spring). A church already existed in the town, but it is not mentioned. King Ludwig I. granted town privileges to Bojnice in February 1366. The king also confirmed the right to have abattoirs, a mill and a spa. Later, it was also allowed to organize fairs and to harvest timber in the forest for free. The town had the right to open and run a quarry.

In 1432 and 1433 the Hussites tried to conquer the castle and the town. Another unsuccessful military expansion was recorded in 1530, when the town was attacked by a Turkish division led by Amurat. At Christmas of 1599, units of the Turkish Grand Vizier Ibrahim attacked the town. During this period the wooden fortification was built (later it was converted into a stone fortification). As a result of the Turkish expansion which ended in the occupation of southern parts of Hungarian Empire, the locus of economic life moved into the territory of present-day Slovakia. The town of Bojnice experienced great developed at this time. Salt, iron, precious metals, timber and agricultural crops (seedlings of saffron, dried fruits and wine) were sold at local markets.

In 1683, an 800-member group of Kuruc troops plundered the town and conquered the castle for a short time. For a second time in the history, the castle was conquered again by Kuruc soldiers after a 10-month siege in 1704. After the liberation of the castle, the economy managed to recover, which is also proved by an urbarial document from 1752. The abolition of serfdom in 1848 led to a long-lasting conflict between local inhabitants and Pálffy, the owner of the castle. People of Bojnice made demands on forests and pastures, for which they were imprisoned and tortured. After a few years, the citizens won the lawsuit. In the years 1889–1910, last owner of the castle, Jan Frantisek Pálffy, launched a large neo-Gothic reconstruction. (Fig. 3)

The region faced bad economic prospects after World War I. and the establishment of the Czechoslovak Republic. This culminated during the economic crisis of 1932. In 1938, Tomas Bata bought the castle from the heirs of Pálffy. The object was used primarily as a warehouse and also for administrative purposes. The onset of socialism after World War II brought the development of agriculture, masonry, fruit breeding and fruit production. The population grew rapidly from 2000 in 1928 to 5113 in 1989. The village of Dubnica, a former farmstead of the Bojnice dominion, was integrated into the town in 1960. (Fig. 7). The period between 1948 and 1989 brought a significant development of the spa industry and of tourism. Currently, the town benefits from a well-developed tourist infrastructure. It is considered one of the most important tourist and spa centres in Slovakia.

#### 7. Landscape development between the 17<sup>th</sup> and the 20<sup>th</sup> century

Landscape development in the studied area in the 17<sup>th</sup> century was influenced by several factors. The country was devastated

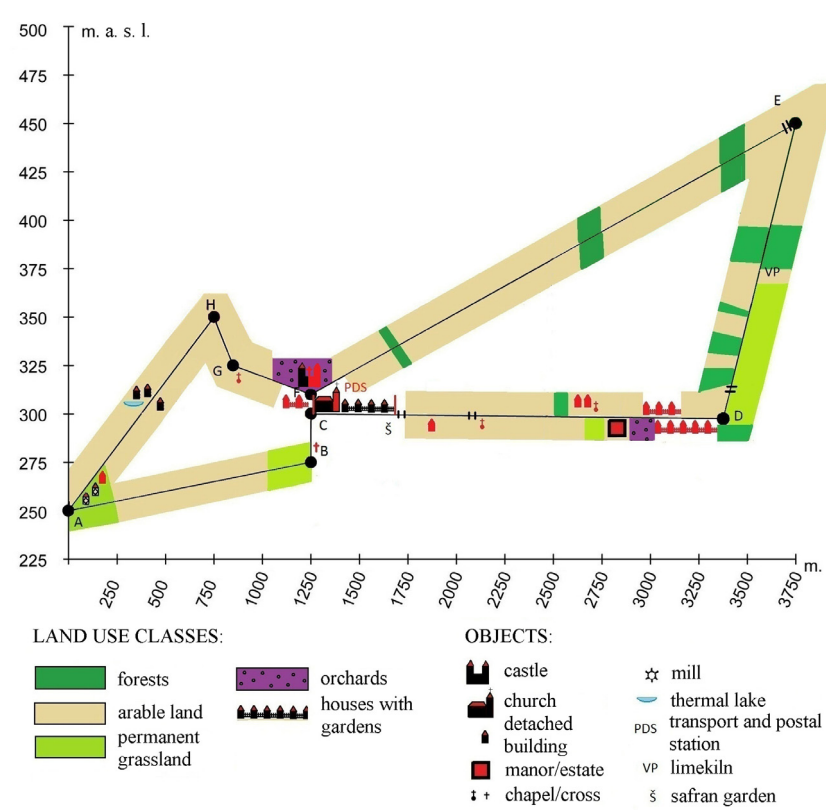
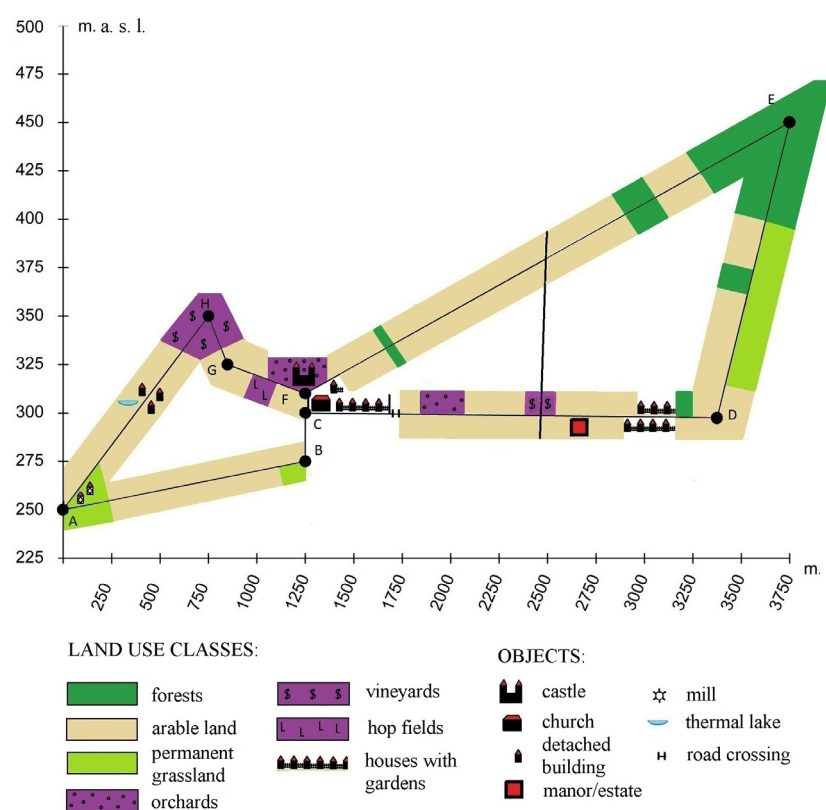


Fig. 4 – Transects of landscape layers illustrating the land use/land cover in 1641-1642 (graph on left) and 1782-1784 (graph on right)

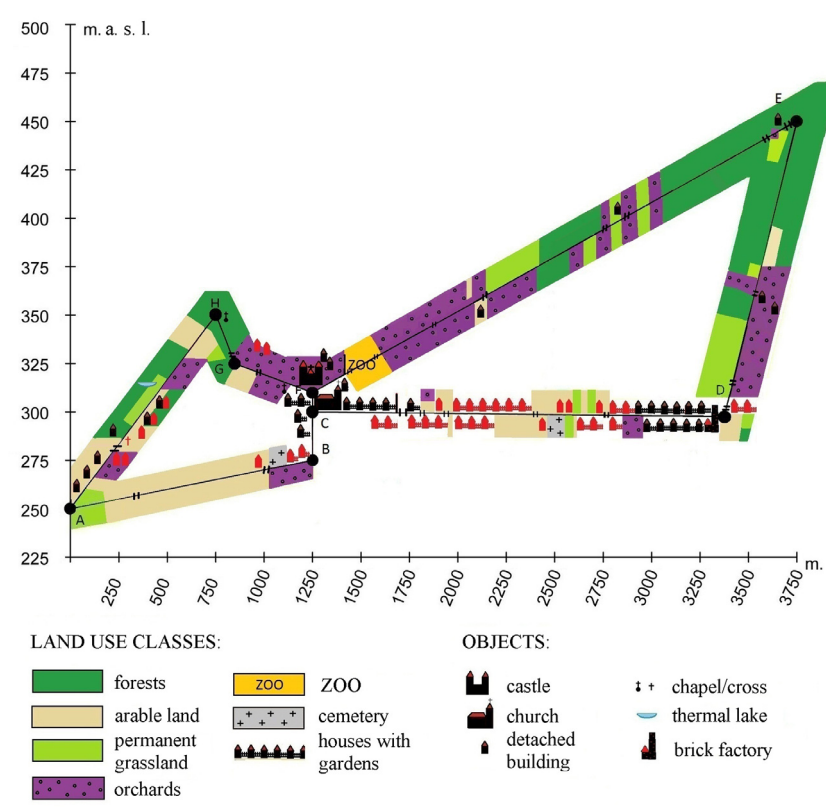
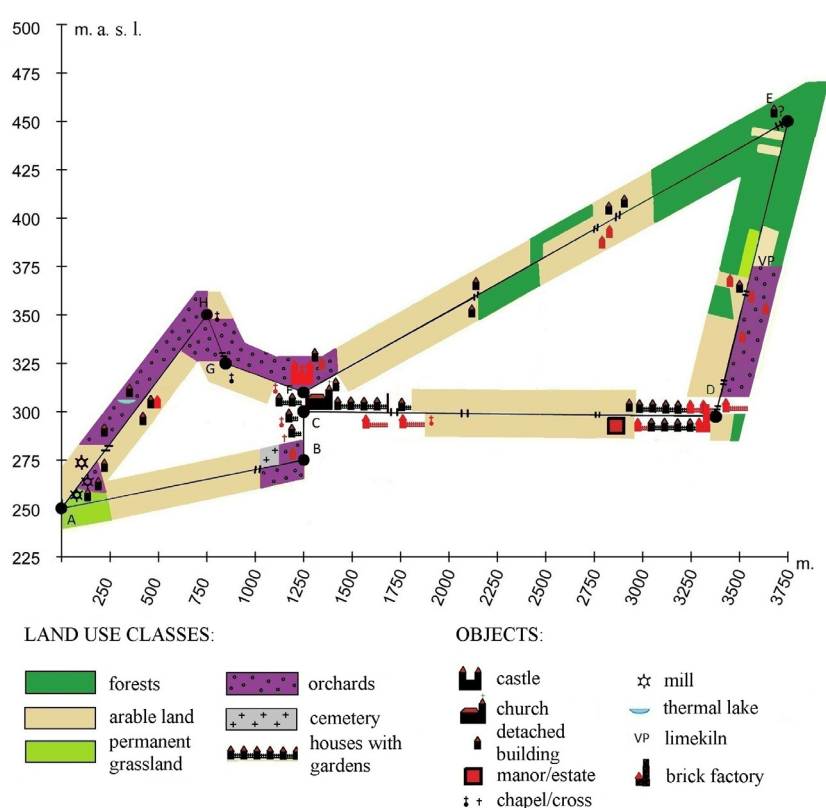


Fig. 5 – Transects of landscape layers illustrating the land use/land cover in 1882 (graph on left) and 1956 (graph on right)

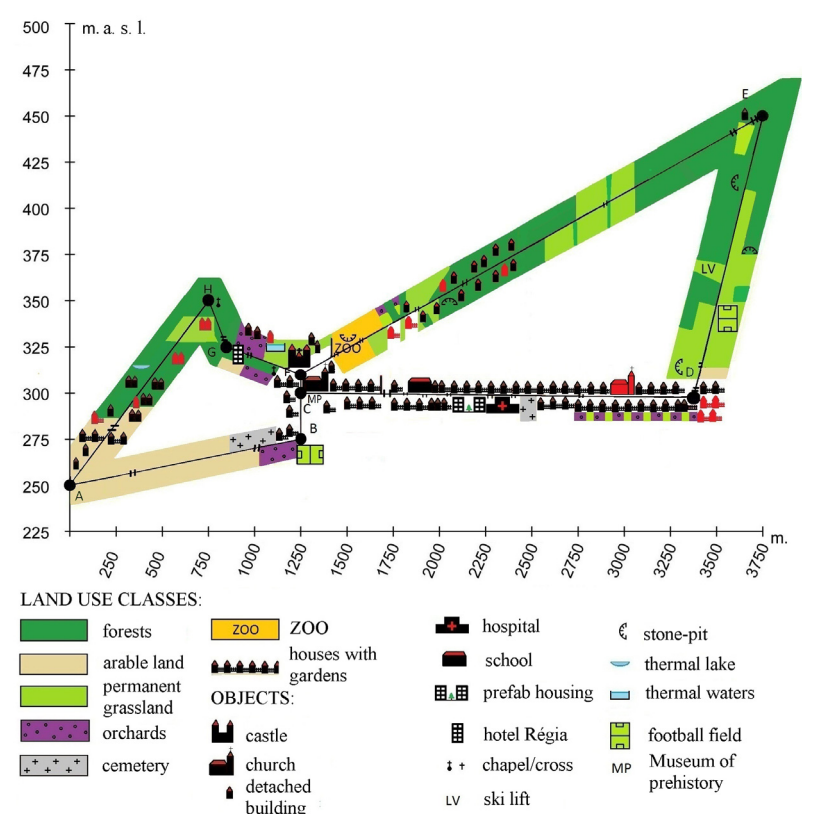
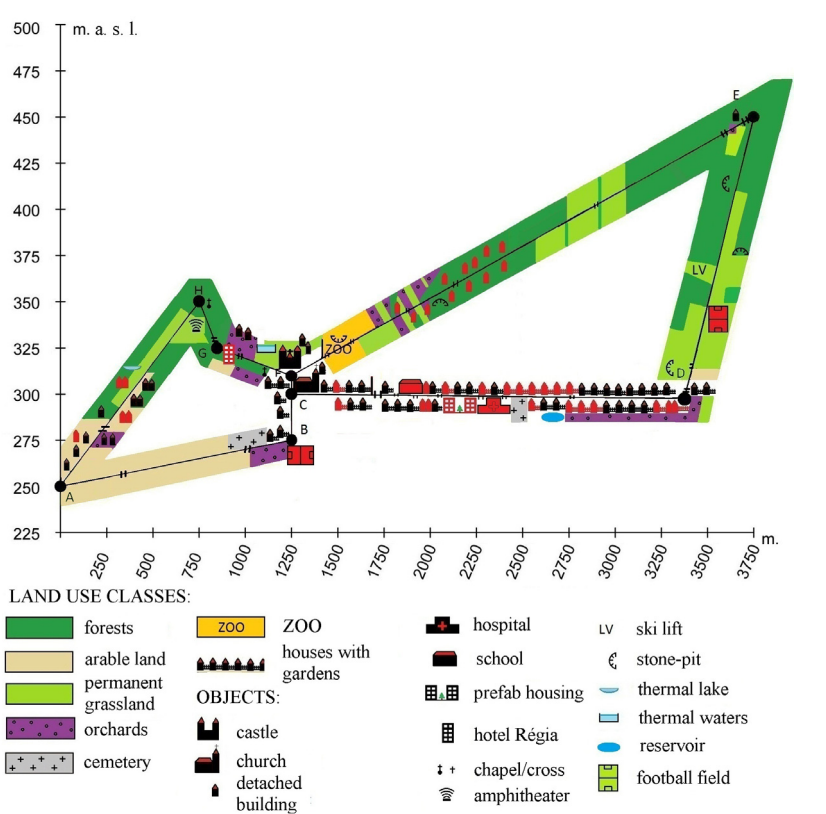


Fig. 6 – Transects of landscape layers illustrating the land use/land cover in 1990 (graph on left) and 2009 (graph on right; new elements are in red)

after frequent attacks of foreign armies. Soldiers consumed fruits and vegetables; they killed livestock and plundered granaries. During this period, arable land situated at altitudes over 325 m above sea level ceased to exist. It was replaced by grass land and later, it was used in the process of forest regeneration. Military attacks negatively affected mostly the viticulture. A significant part of vineyards was left uncultivated. Although fruits were sour, the sale of wine was one of the few opportunities for local people to gain some income. The Bojnice municipal book mentions e.g. vineyards, hop gardens and orchards of pears, plums, apples, apricots and nuts. (Fig. 4).

Ledent's works from 1641 and 1642 (Fig. 3) clearly prove that the town's hinterland was significantly modified by the impacts of deforestation. Slope foothills of Mala Magura Mountains were covered with only islands of forests, probably oak woods. These slopes were used, due to the location and the terrain, as pastures and meadows rather than arable land. Massive shortage of wood led to the restriction of the free access to forests, which was adopted in 1647 under new municipal privileges. Serfs used wood as fuel, but also as a material for the production of shingles and boards which were sold at fairs. They did not respect this prohibition. The right of free access was one of the major issues of concern over the following several centuries. Livestock was the main source of livelihood for the local populace. Permanent grass land in southern parts of the studied area, primarily in river floodplains, served as pastures. The town was surrounded by wooden palisades, later to be replaced with a stone fortification (Fig. 8). Strengthened defences stimulated the development of commerce.

At the beginning of the **18<sup>th</sup> century** the town suffered from new military attacks. Kuruc soldiers occupied the castle in the years 1704–1708. During these years, they pillaged and plundered the region. These historical events left devastating marks on the landscape. Viticulture completely disappeared in the 18<sup>th</sup> century, also as a result of changing weather conditions. The economic situation stabilized in the second half of the 18<sup>th</sup> century. The owner of the castle ordered its reconstruction. Members of Palfy family strongly supported the re-Catholization. Certain buildings, e.g. a church tower, a castle chapel, Calvary or many roadside chapels and crosses were constructed during this time. New residential buildings were built even outside of the fortifications. (Fig. 4). The end of the 18<sup>th</sup> century brought a significant expansion of livestock production, which is confirmed by extensive grass lands coverage and the construction of new farm buildings. Grass land covered 13.8% of the surface in the studied area in the period between 1782 and 1784 (Fig. 7). Scattered settlements called kopanice were established, most of them located at higher altitudes. They absorbed the last remnants of forest. Forest vegetation covered approximately 8.5% of the area in the years 1782–1784. Arable land reached its peak in the period with a share of 72.4%. In 1769, the forest reforms made by Maria Theresa came into force. The aim of new forest policy was to ensure the regeneration of forests.

The **19<sup>th</sup> century** brought major social and economic changes initiated by the abolition of serfdom (1848) and the beginnings of a capital-oriented economic system. People were often unable to adapt to new conditions and many of them suffered from poverty. The share of arable land decreased from 54.8% in 1845 to 48.8% in 1882. Although owners of the castle made efforts to introduce new agricultural technology, the old system of crop rotation still dominated. In Slovakia, it was also known as a three field system. (Fig. 5 and 7). The area of forest vegetation increased from 8.5% in the 18<sup>th</sup> century to 27.1% in 1845 and 29.5% in 1882. Decrease in the share of grass land (from 13.8%

in the 18<sup>th</sup> century to 6.4% in 1845 and only 5.0% in 1882) shows a stagnation of livestock management. The adverse situation was also a result of a crisis in the markets. Mountain breeds were replaced by new species from the south. Fruit production, drying and fruit distillation remained among the few opportunities to make profit. New orchards were established at nearby locations. Permanent cultures occupied 6.7% of the land in 1845 and 10.9% in 1882. The town was constantly expanding. New dwellings and farm buildings were built outside the fortification system, increasing the share of built-up areas from 4.2% in the 18<sup>th</sup> century to 4.6% in 1882.

In the early **20<sup>th</sup> century** the poor economic situation deepened. Many of the local inhabitants left for seasonal work. Some of the inhabitants participated in the reconstruction and completion of the Bojnice castle and the square. The share of fields continued to decrease, from 48.8% in 1882 to only 37.7% in 1956. Arable land came to be used for pasture or it was slowly overgrown by forests. The end of World War II was the moment which initiated significant changes in land use. In accordance with the new socialist methods, small narrow stripe-shaped fields were merged into larger units, which paradoxically caused a reduction in the extent of agricultural land to a 37.7% share of total land cover in 1956. Scattered settlements and arable land on steep slopes almost disappeared. Northern steep slopes were turned into forests (31% share in 1956). Southern parts of the slopes were changed into orchards (10.9% share in 1882, 18.2% share in 1956) (Fig. 5 and 7). The socialist system introduced the phenomenon of agricultural collectivisation. Large industrial companies were established, collective residential structures were built. Some pastures were re-established and also livestock production was restored. Permanent grass land occupied about 6.8% of the area in 1956. Since the end of World War II, a massive construction of residential houses began. In 1882, built-up areas covered about 4.6%, increasing to 5.6% share in 1956. In the second half of the 20<sup>th</sup> century, the main economic function of the town changed. Agriculture and masonry were replaced by tourism and the spa industry. The town's new recreational function was supported by large investments in infrastructure (accommodation and catering facilities, bathhouses, sport arenas, etc.). Holiday cottages began to absorb the area of former scattered settlements and orchards.

The forty-year existence of the socialist system resulted in remarkable changes in land use. By 1990, slope foothills of Mala Magura Mountains were completely covered by forests (31.7%). Forest vegetation was lined with orchards (permanent cultures reached 13.6% share of the overall land use structure) and holiday cottages (Fig. 6 and 7). However, the share of orchards declined over this period. Arable land was converted into orchards or reduced due to housing development. The large spatial presence of grassland in the second half of the 20<sup>th</sup> century is the result of the destruction of orchards, which were turned into meadows and pastures (reaching a share of 15.1% in 1990). Livestock production achieved moderate growth between 1960 and 1980, but stagnated afterwards.

In 1989, the socialist system was replaced by a system of market economy, which triggered other landscape changes. This mostly affected the existence of orchards, whose area continued to shrink. The study area can now be divided into two different segments, based on the level of human activity. At lower altitudes (mostly the area of the town itself and nearby locations), there is a remarkable influence of human activity with significant growth of settlement structures, increasing the share of built-up areas from 13.1% in 1990 to 14.3% in 2009. The other segment includes areas at higher altitudes, which mostly covered

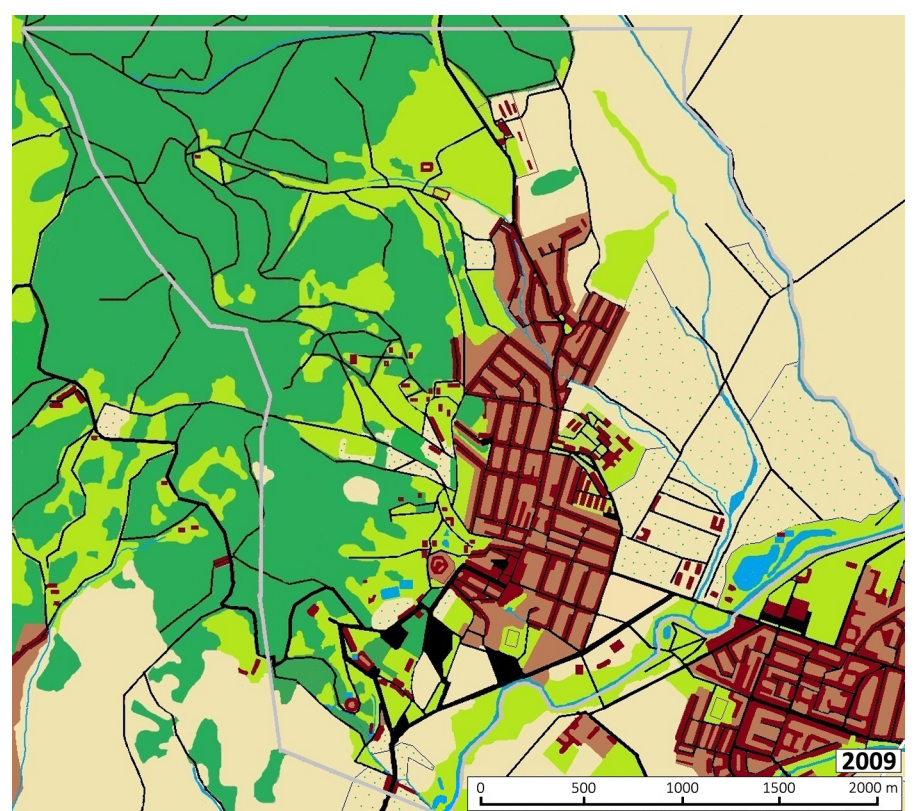
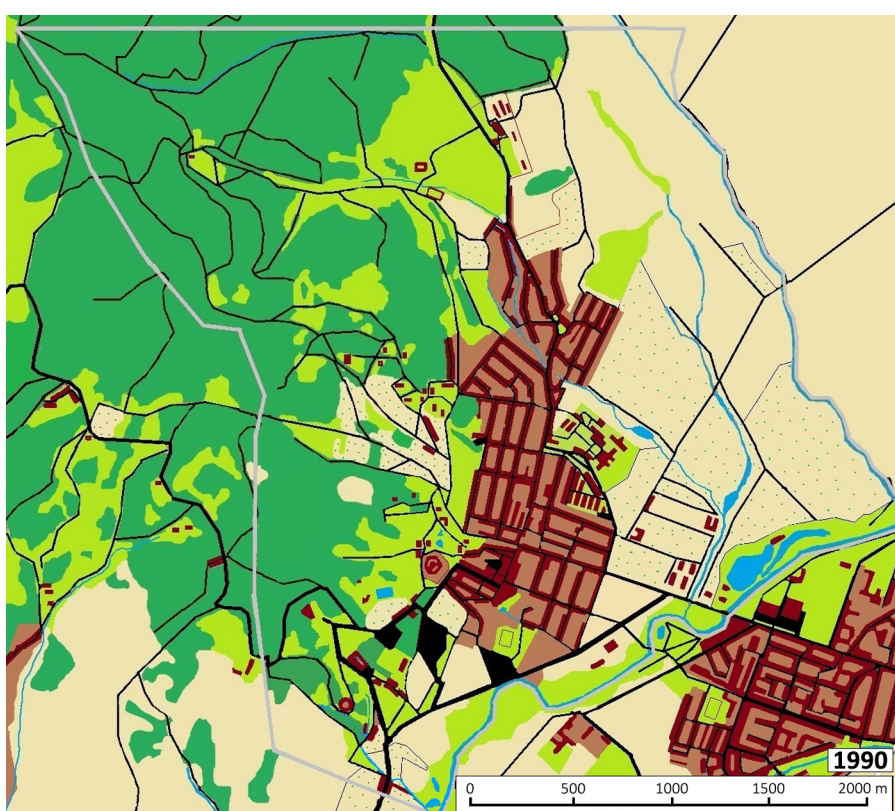
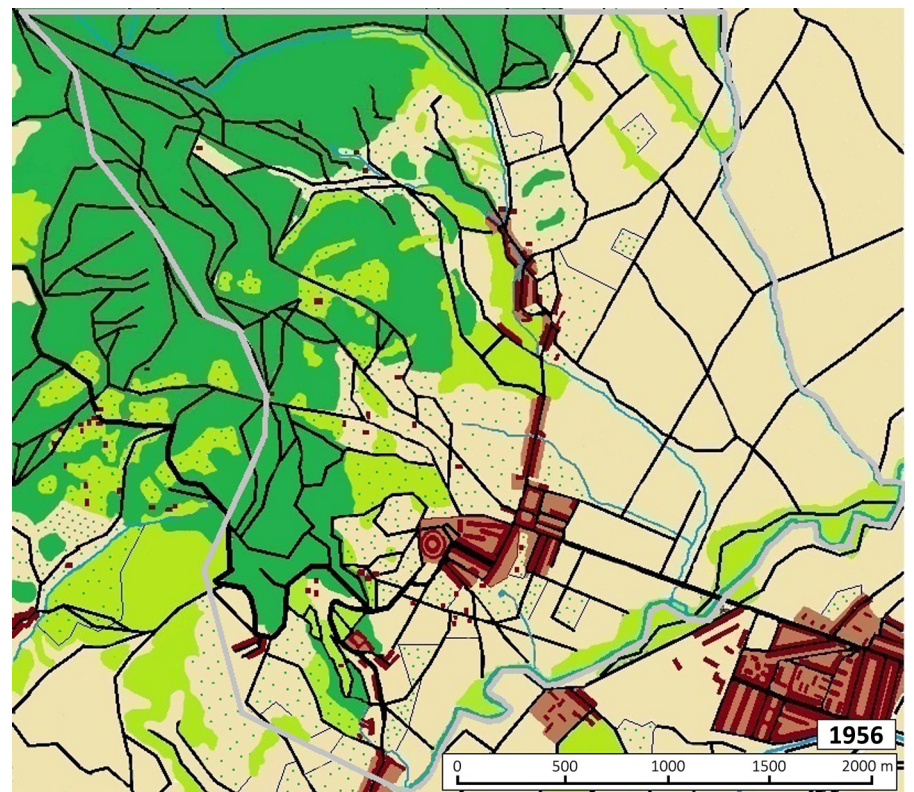
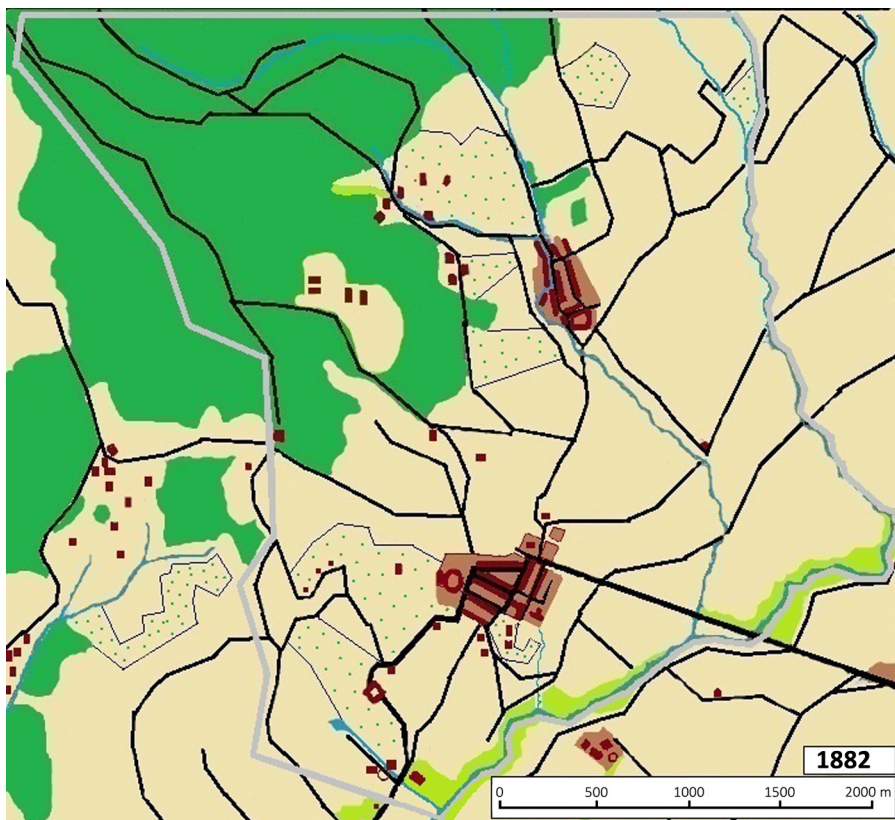
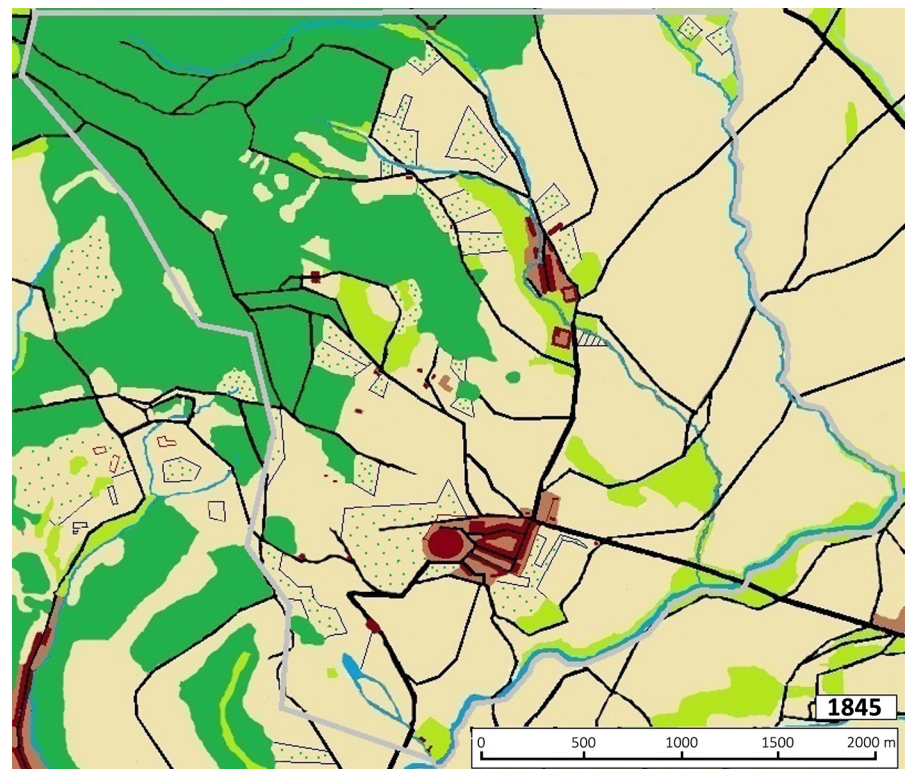


**Fig. 7** – Land use classes in Bojnice between the 18<sup>th</sup> and the 21<sup>st</sup> century. View of the Bojnice town and the settlement of Dubnica.

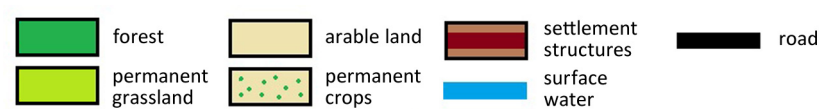




Fig. 8 – 3D model of the studied area – comparison of built-up areas in the 17<sup>th</sup> and the 19<sup>th</sup> century. Authors: Ľ. Žabenský and M. Kozár.

by forests whose share increased from 31.7% in 1990 to 33.4% in 2009. Forests have absorbed the remnants of orchards, meadows and pastures (Fig. 6 and 7). Human activity in the area receded. The overall landscape heterogeneity has decreased together with the changing attitude of man to land.

## 8. Conclusions

In the past, human life depended on land. Human values were formed on the basis of man's relationship to the land they lived on. Arable land occupied larger areas, also due to the lower technological level of agricultural production. Over time, the area of arable land decreased in proportion to the increasing intensity and spread of cultural innovations (e.g. new technologies in agriculture). On the other hand, arable land came to be managed more effectively and its yields increased significantly (Fig. 2). Nowadays, the bond between man and the land is not as intense and our attitude to land use is changing. Economic and recreational interests dominate. Subsequently, the importance of the genius loci, landscape heterogeneity and historical landscape structures has been reduced.

The structure of land use classes reflects how man used to meet his needs at different points in the past and how it is today. In the 18<sup>th</sup> century and the first half of the 19<sup>th</sup> century, livestock was considered an important source of livelihood and income for people living in mountainous areas. Declining share of permanent grass land at the end of the 19<sup>th</sup> century confirms the gradual stagnation of livestock farming. Kováč (1967) states that the crisis was associated with low prices of cattle in the markets. Increasing share of forests in the 18<sup>th</sup> and 19<sup>th</sup> century is related to the reforms issued by the ruler Maria Theresa in the forestry sector. New rules were adopted on the whole territory of present-day Slovakia. This process continued in the 20<sup>th</sup> century, mainly due to the decline of human agricultural activities (except forest production and recreation) in the above-lying areas. The only exception applies to the first half of the 20<sup>th</sup> century. Strong demand for raw materials, also triggered by the war, led to a massive deforestation in some areas of Slovakia. Fruit production, fruit drying and distillation was, from the 17<sup>th</sup> century to the 20<sup>th</sup> century, one of the principal sources of income for the population which remained in the mountainous regions of Slovakia. The largest territorial expansion of orchards is recorded in the first half of the 20<sup>th</sup> century. Fruit production is stagnating and slowly ceases to exist nowadays. Settlement structures faced enormous growth during the 20<sup>th</sup> century. The village of Dubnica was administratively and structurally incorporated into the town Bojnice in 1960. Settlements were mostly built over the areas of former orchards. Massive growth of settlement structures in Czechoslovakia started after World War II. It is associated with the economic boom, the socialist ideology and the introduction of new technologies.

In the past (and to a lesser extent even today), the landscape presented a barrier limiting certain human activities. The further we go back in the time, the greater is the dependence of man on land. Although human activities were limited by given conditions, the landscape also provided possibilities to satisfy human needs. Our needs (as a society) are progressively increasing over time. After the fulfilment of fundamental (physiological) needs, other needs follow. They are met primarily through the work which changes the thinking of man and constitutes values. Work and creation of cultural values in time change the ratio between the natural and the cultural landscape. Cultural landscape represents the spatial expression of cultural values that arise on the basis of needs and their satisfaction through work.

## References

- BIČÍK, I., JELEČEK, L., ŠTĚPÁNEK, V. (2001): Land-use changes and their social driving forces in Czechia in the 19<sup>th</sup> and 20<sup>th</sup> centuries. *Land Use Policy* 18, p. 65–73.
- BOLTIŽIAR, M., OLAH, B. (2009): *Krajina a jej štruktúra*. UKF Nitra, 150 s.
- BRTEK, J. (1990): *Príroda horného Ponitria*. Martin: Osveta, 120 s.
- ČUKAN, J. (2001): *Dolnozemske reflexie na neroľnícke zamestnania*. UKF Nitra, 234 s.
- FERANEC, J., OŤAHEL, J. (2001): *Krajinná pokrývka Slovenska*. VEDA, Bratislava, 122 s.
- HAGARA, L., HAGAROVÁ, M. (1970): K edícii Bojnickej mestskej knihy (1525–1753). In: *Vlastivedný zborník Horná Nitra VIII*. Martin, s. 89–109.
- JELEČEK, L., BIČÍK, I., ŠTYCH, P. a kol. (2012): Changes of Land Use Structure in Czechia: Case Study Area Kobyly: Change of Land Use Patterns 1827–2001. In: BIČÍK, I., HIMIYAMA, Y., FERANEC, J., ŠTYCH, P. (2012): *Land Use/Cover Changes in Selected Regions in the World*. Institute of Geography, Hokkaido, 80 p.
- KOVAČ, J. a kol. (1967): *Bojnice*. Stredoslovenské vydavateľstvo, Banská Bystrica, 255 s.
- KUBOVA, A., VALOVIČ, D. (1990): *Bojnice*. Tlačiarne SNP, Martin, 96 s.
- KURPAŠ, M. (2010): Tradičná architektúra v kontexte cestovného ruchu v Liptove. *Kontexty kultúry a turizmu*, 3/1, s. 3–7.
- LENOVSKÝ, L. (2009): *Kultúra kúpeľného mesta*. UKF Nitra, 183 s.
- OŤAHEL, J. et al (2004): *Krajinná štruktúra v okrese Skalica: Hodnotenie zmien, diverzity a stability*. Geographia Slovaca, 19, Bratislava (SAV), 123 s.
- PETROVIČ, F. (2005): *Vývoj krajiny v oblasti štálového osídlenia Pohronského Inovca a Tribeča*. SAV, Bratislava, 209 s.
- POKORNÝ, M., HÁJEK, M. (2008): Analýza priestorových objektov na mapách I. vojenského mapovania. *Kartografické listy*, 16/4, s. 74–84.
- PUCHEROVÁ, Z. (2004): *Vývoj využitia krajiny na rozhraní Zobora a Žitavskej pahorkatiny*. UKF Nitra, 147 pp.
- SOPKO, J. (1962): Po stopách Hornonitrianskeho vinohradníctva. In: *Vlastivedný zborník Horná Nitra I*, Banská Bystrica, s. 69–85.
- ŽABENSKÝ, M. (2013): *Náuka o krajine a Kultúrna geografia Slovenska*. UKF Nitra, 136 s.
- ŽABENSKÝ, M. (2013): *Štúdium krajiny v kontexte historického vývoja a jeho prínos pre kulturológiu (na príklade mesta Bojnice)*. *Historická geografia*, 39/2, s. 265–286.
- ŽIGRAI, F. (1997): *Kultúrna krajina ako obraz vzťahu človek–prostredie*. Zborník z konferencie: *Krajina, človek a kultúra*, Banská Bystrica, s. 45–53.