CONTENT

CHANGES OF LANDSCAPE – ENVIRONMENTAL ASPECTS

TRKMANKA – HISTORICAL DEVELOPMENT OF LANDSCAPE

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Abstract: *The Trkmanka catchment area belongs to the oldest settlements in our country as evidenced by the numerous archaeological findings documenting the presence and activities of people in prehistoric and historic times. As human impact on the landscape grew stronger, it resulted in its present form with the prevailing agricultural land. Only by studying historical documents we can get an idea of how the landscape looked like before the Trkmanka intensification of farming, with all balks, ditches, sunken lanes that accompanied ecotone communities.*

Our paper overviews developments and activities of human society in the area of interest from the Paleolithic and the causes and impacts of its activities on the landscape.

Key words: *landscape ecology, landscape development, ecotone, landscape structure, GIS*

INTRODUCTION

The Trkmanka catchment area is the one of the oldest settlements in the Czech Republic. This fact is evidenced by the numerous archaeological findings documenting the presence and activities of people in prehistoric and historic times. The human impact on the landscape grew stronger and resulted in its present form with the prevailing agricultural land.

Research on the landscape and its use is very important. The history of the branch of science dealing with the relationships between natural conditions and the economic utilisation of a monitored area dates back as to the 30s of the 20th century.

Landscape utilisation is a means of expressing the spatial, productive and non-productive potential of an area. Landscape structure is affected by the size and frequency of landscape elements, their horizontal layout and location.

METHODS OF PROCESSING

The geographic information system GIS plays the most important role in computerised data processing. This system enables us to save, analyse and visualise spatial data efficiently. Spatial data to be saved have two components: a geographic reference localising the particular object or phenomenon, and an attribute component comprising properties of the respective object or phenomenon. The data can be in vector or raster formats. When studying landscape, GIS is often used for keeping records of the graphic documents of scientific research projects and studies, or the generation of computerised maps and graphic outputs, but primarily it serves as a tool for spatial modelling. Mobile GIS which enables effective field-data capture is used for primary data capture.

The opposite of direct field-data capture is data capture in a distant form, i.e. remote sensing of the Earth. Its main advantage is the possibility of monitoring developments by means of image sequences. Different purposes require different types of images. The two most important types are spectrozonal and multispectral images. GIS is also linked to spatial decision support systems. These systems represent a special type of information systems for decision-making as to the problems difficult to formulate or to structure if automated systems are impossible to use. The next level is expert systems. An expert system can be defined as a computerised system to seek solutions to a problem within a defined set of statements or set of information formulated by experts for the specific applications.

Monitored ecological indicators mainly include an coefficient of ecological stability of landscape showing an ecosystem's ability to compensate for changes caused by external factors in order to keep its natural properties and functions. This closely relates to the erosion hazard and landscape storage capacity.

Due to its complexity, the real world is impossible to completely "reproduce". We are forced to model uncertainties which introduce fuzzy logic to problem solving. Fuzzy theory is then practically implemented through decision-making processes.

The Czech Republic has quite a large set of data which effectively captures the landscape situation through several time horizons in the course of the last two hundred years. In our research on the changes of the landscape utilisation and structure all available maps were used. In addition to historical maps and the first, second and third military mapping surveys, these included the state maps series (in particular the state maps at a scale of 1 : 5 000); the map of landscape utilisation (the output of a previous international project); data obtained from the Czech State Administration; data regarding forest typology; data from biotope mapping within the project NATURA 2000 and aerial and satellite images.

For our research of landscape development in the Trkmanka catchment area a great number of methods and processes were used. They can be divided in three parts: research into historical maps and literary sources, field research and measurements in situ and data processing in geographic information systems.

At the very beginning an extensive literary research was carried out as to the physico-geographical and socio-economic characteristics of the monitored area, the historical development of the region, and the issues relating to the landscape structure and its development.

Key data for the analysis of the landscape utilisation and landscape structure were obtained by applying cartographic methods. In total, seven reconstructed maps, from the 18th century to date, were used. All these reconstructed maps were created by vectorisation of historical maps using the same key to all symbols. Two-dimensional and linear elements were mapped.

The geoinformatic methods used included processing historical maps of the landscape utilisation and creating the map of the current landscape utilisation and determining attributes and landscape metrics. It was necessary to visualise transition zones and upon their evaluation by means of various methods to develop the landscape assessment system. Analyses of humidity and biomass parameters of the vegetation cover were carried out using remote sensing of the Earth. The use of modern technologies enabled us to develop a dynamic landscape simulation model.

THE STUDY AREA

The Trkmanka catchment area (380 km^2) lies in the Carpathian part of the Czech Republic. It consists of the flysh belt of the outer part of the Western Carpathians and the Vienna Basin. Its prevailing parts are formed by sedimentary fill. Its lowest parts, belonging to the vale Dolnomoravský úval, have a flat alluvial relief. The upland and highland parts of the Trkmanka catchment are mostly formed by rocks of the formation Ždánicko-hustopečské souvrství. In the north lies the forest Ždánický les with the highest point of the

Trkmanka catchment U slepice peak (437.4 m). This forest belongs to the highlands Dambořická vrchovina. The highlands Boleradická vrchovina are located in the middle of the catchment area. Their broadly curved water divide ridges of plateaus and wide open valleys are continued in the broken highlands Hustopečská pahorkatina. Most of the area lies in the chernozem region in the warm climatic regions T 4 and T 2. Only the north lies in MT 11 climatic region (mild to warm). Most of the catchment area lies in the least water-rich area, but its smaller part at higher levels lies in a little water-rich area with a small capacity for the catchment of water and highly changeable runoffs throughout the year.

The Trkmanka catchment area belongs to the three belts from the heights of 160 m to 432 m: 1. oak, 2. beech/oak, and 3. oak/beech. Forest land occupies only 18.3 % of the land, which is far below the Czech Republic average. On the one hand vast areas of the catchment area are forest-free, on the other hand, natural dendroflora has been preserved to a great extent.

Great parts of the Trkmanka catchment area have been cultivated since Neolithic times. Agricultural land prevails, i.e. fields, vineyards and the orchards of thermophilic fruit trees, but lovely unmanaged remnants of xerothermic land rich in species can also be found. There are not many forests in the monitored area. It is mostly forest-free.

Permanent grassland (meadows and pastures) currently occupies only 3.5 % of the catchment area studied. In the south just remnants of alluvial meadows rather rich in species have been preserved. Very rare halophytes are protected as natural monuments in the meadows Trkmanské louky and the ponds Trkmanec–rybníky.

Other parts consist of cultural meadows not very rich in species. Arable land currently occupies 57.6 %, hence forming the prevailing landscape cover type in the catchment and its area considerably exceeds the state average. Orchards and gardens (3.2 %) together with vineyards (8.2 %) contribute to the agricultural nature of the catchment area. Apricots, peaches and grapes are grown there. Water areas occupy just about one hundredth of the catchment area, which proves its generally dry makeup.

THE LANDSCAPE DEVELOPMENT

The properties, structure, functions and appearance of a landscape depend on its history, development and human impact. The current landscape structure has been developed by a combination of natural and anthropogenic conditions.

The landscape utilisation and its structure are the key indicators of the conditions and developments of a landscape.

The current landscape is a result of both the long-term impact of landscape-forming processes continuing among biotic and abiotic landscape elements and the impact of humans in the last millennia. In the monitored period (1764–2008) the Trkmanka catchment area went through many changes.

The evaluation and comparison of the landscape in particular periods of time brought many interesting and often surprising results. Analyses were focused on the evaluation of landscape changes in the monitored period. The most significant changes occurred in the permanent grassland. The total area of the permanent grassland decreased over the whole period. The same was true for water areas, mainly as a result of land drying and changing water areas into arable land. Arable land area mostly increased throughout the period. However, in the last years arable land areas decreased because of the introduction of sustainable development. Fluctuations in the areas of vineyards and orchards are based on historical, cultural and economic developments, too (see Table 1).

The research brought the spatial data of the condition of the landscape Trkmanka catchment in the monitored time horizons. The data were used to obtain the additional information about the conditions of the landscape, which is an advantage of processing in GIS. Coefficients of ecological stability of landscape were calculated for the whole Trkmanka catchment area and for some selected areas. The results were determined using the quantitative values of the landscape utilisation categories of the reconstructed maps (see Table 2). Ecosystem stability can also be expressed by persistance of areas giving the percentage of temporally and spatially stable areas in relation to the area of the particular landscape utilisation category at the initial state.

The analysis of landscape utilisation and landscape structure enabled to express the landscape conditions in terms of landscape ecological indices. Landscape metrics (indices) quantify structural properties of a landscape. A number of indices were developed that could be statistically evaluated to ascertain the exact mathematical treatment of the quantifiable properties of the landscape. The monitored characteristics included the length of edges between the landscape utilisation categories, diversity indices, etc.

The dynamics of developments in particular landscape utilisation categories was expressed by a change index. This gives a percentage of areas with a change of landscape utilisation. Analyses of the landscape utilisation in the Trkmanka catchment area, when taking the year 1836 as the initial state to ensure a greater accuracy of determination, show a great differentiation among varying landscape utilisation categories. Stable areas take approximately one third of the total area and the prevailing parts are arable land and forest land. Some of the less stable areas are those that were utilised in the same way repeatedly over the monitored period of time. The temporal and spatial stability of linear structures was studied in the same way as that of non-linear structures.

Tab. 1: Changes in extent of selected areas (in %)

	1764	1836	1876	1920	1953	1996	2001	2008
Forest	20.2	19.1	16.4	14.3	17.8	18.4	18.2	18.3
Arable land	49.6	44.8	61.7	61.9	60.5	60.9	58.6	57.6
Perm. grassland	17.9	19.2	12.3	7.4	6.3	1.8	3.0	3.5
Orchard, garden	0	0.1	0.1	5.6	1.0	4.7	4.8	3.2
Vineyard	7.7	13.0	6.8	5.4	9.0	6.3	7.5	8.2
Water area	2.4	1.3	0.2	0.2	0.1	0.1	0.2	0.3

Source: our research

Tab. 2: Ecological stability coefficient development

	1764	1836	1876	1920	1953	1996	2001	2008
KES (Míchal)	0.92	1.03	0.52	0.54	0.52	0.45	0.50	0.50
KES (Miklos)	0.43	0.42	0.34	0.34	0.34	0.32	0.33	0.33

Source: our research

CONCLUSION

The landscape of the Trkmanka catchment area is a long-populated and intensively cultivated area. The calculation of the KES shows that at the beginning of the monitored period the landscape was more stable than at present. This is due to loss of forests and grasslands and increase of the arable land. However, in recent decades some slightly optimistic changes have occured as a result of the changes in farming systems.

Trkmanka – historický vývoj krajiny

Území povodí Trkmanky patří do oblasti nejstaršího osídlení našeho území, což dokládají mnohé archeologické nálezy z doby předhistorické i historické. Sílící vliv člověka na krajinu vyústil v dnešní podobu povodí, v němž převažuje zemědělská půda. Studium historických podkladů umožňuje poznat vývoj krajiny povodí Trkmanky v minulých stoletích se všemi mezemi, příkopy, úvozovými cestami, které doprovázela ekotonová společenstva před intenzifikací zemědělství ve 20. století.

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CURRENT APPROACHES APPLIED IN THE LANDSCAPE RESTORATION IN OSLAVANY POST-INDUSTRIAL MINING AREA

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Abstract: *The Oslavany region, situated 30 km southwest of Brno, represents one of many smaller existing post industrial mining areas called brownfields. Many* *reclamation approaches applied to larger areas have been taken into consideration worldwide. Mostly, the problem with the smaller ones lies in the fragmented attitudes toward post industrial landscape restoration. This means that several uncontrolled experiments have been undertaken. The mine spoils which have been created can be technically restored after 8 years of deposit stabilization. During this time a specific stage of vegetation succession develops which could culminate with stages close to climax. This process of spontaneous succession may be more beneficial than applying a technically conducted rehabilitation process to the mine spoils or their new reopening. After some time the altered landscape regains its balance and another human impact can start it again. Besides that, repeated extractions of stored material can be seen. The process of landscape disturbance resumes and erosion from weathering is inevitable. But according to our current laws this can be done.*

Key words: *landscape restoration, reclamation, revitalization, brownfield, mine spoils*

LANDSCAPE RECLAMATION, REVITALIZATION OR RESOCIALIZATION?

Act No. 44/1988 Coll., on the protection and exploitation of mineral wealth, instructs in its full actors in mining operations to ensure the removal of all damage caused by mining, which is filled with the final phase of mining activity. Although the responsibilities of the Act were set up in the late 80's of the 20th century, the development of the Czech reclamation school began in 1852 during the Austro-Hungarian Monarchy. At that time, the old mining laws required entrepreneurs to care for the land used in mining activities so that the land could be returned to its original purpose. The first organized land restoration took place in 1908 in the northern Bohemia branch under the supervision of the Provincial Agricultural Board. Already in this period, the term landscape reclamation was used within the framework of landscape restoration. For economic reasons the value of the land was established and served as a basis for the calculation of taxes and, as it is well known, to generate money needed for warfare. The definition of landscape reclamation is, according to Vráblíková (2008), is cited in relation to land (agriculture) as re-cultivation of derelict or damaged land for the purpose of recovery of agricultural production or forestry activities. Revitalization, in contrast to reclamation, differs in that it tries to incorporate the affected area back into the overall landscape. Its aim is to restore the function of the natural ecosystems, while allowing the use of the whole territory in accordance with the land use plan. According to V. Cílek, at present we should talk about the revitalization of the landscape because at present we have an excess of cultivated land. On average, approximately 40 % of the regenerated areas should be revitalized. Of course, everything depends on the specific case of the affected area; its size, land use plan and other aspects. Landscape resocialization is then understood as a return of life to the landscape and the creation of conditions conducive for housing, livelihoods and leisure time in the renewed landscape.

The whole regeneration of an area after anthropogenic interference is a matter of two basic stages. Mining-this technical stage represents the end stage of extraction along with the subsequent clean-up preparatory work involving remedial overburden, the construction of dumps, etc. The ecotechnical stage - includes technical aspects of the work (landscaping, hydromelioration treatment) and self-reclamation work (hydric, agricultural, forestry and others) those of a biotechnical nature. In the former, a limestone quarry is another option which can be used. It means the revitalization of the landscape, although many botanists use the not very appropriate term – reclamation. On the other hand, controlled succession is often used within reclamation measures. In revitalizing a limestone quarry it is important to use different solid bedrocks for the development of a diverse mosaic of communities to guard against the obliteration of the quarry walls and for the faster onset of uniform vegetation (Tichý, 2004).

CHARACTERISTICS OF STUDY AREA

Oslavany is located in the valley of the Oslava River, approximately 30 km southwest of Brno, and is known for its coal mining in the wider district of Rosice-Oslavany. It is a part of the Rosice-Oslavany depression that is located in the southern part of the Boskovice Furrow and from north lying Letovice depression is separated by the Tišnov-Kuřim Threshold (Beneš et al., 1967). The source of coal dates from the Carboniferous and the Permian periods and the seam was up to 6 meters thick. Its extraction from the Oslavany mine named Kukla was stopped in 1973. During the whole extraction period nearly 65 million tons of coal were removed. The not very high quality coal from the mine served as fuel for the Oslavany power plant, which was closed in 1992. A remnant of the mining in the Kukla Mine is a relatively large dump (heap), along with abandoned buildings. The activities of the plant are identifiable, especially the ash heap which creates a strong anthropogenic formation (Fig. 1).

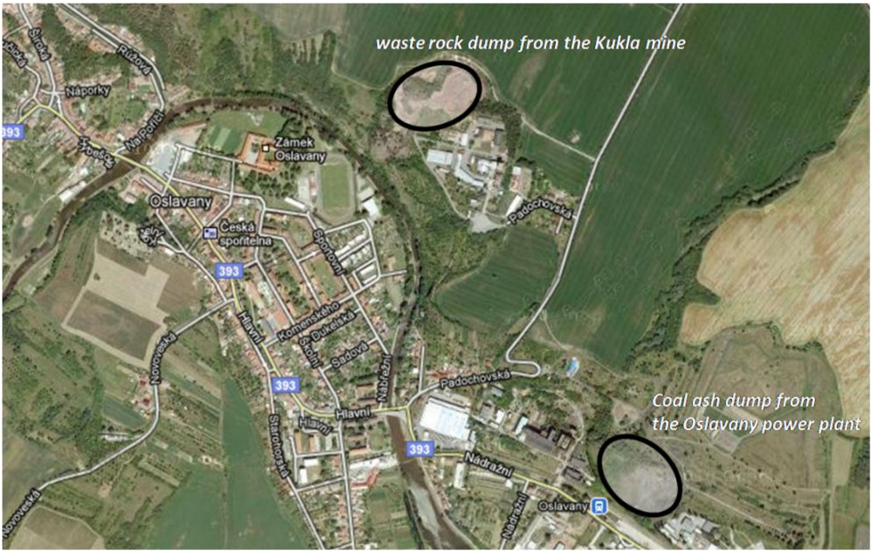

Fig. 1: Anthropogenic bodies in the Oslavany region
Source: Google maps

Waste rock dump from the Kukla mine

The Kukla Mine, originally titled the New Shaft, was excavated in 1865 as a ventilation shaft and drainage system of the Františka Mine. Later it was decided to also build a mining shaft. In the years 1911 - 1913 the whole complex was modernized and the mined coal provided enough fuel for the newly built plant. The original building was demolished and replaced by new ones. The Kukla Mine became the most elaborate complex of the Rosice – Oslavany mining area. In 1947 it was renamed the Václav Nosek Mine and after the construction of a new central shaft – the Jindřich II Mine - mining was ended in 1973. The mine was 881m deep and had 11 floors (Plchová, 1992). The underground mining areas are now flooded and the mine water flows into the Dědičná tunnel in the cadastral area of Oslavany. Due to the contamination of the underground water (increased concentrations of manganese and iron), a mine water treatment plant was put into service in 2001. Today's form of a waste rock dump is more like a torso that was left after the end of extraction. It is located northeast of Oslavany towards the village of Padochov (Fig. 2)

Fig. 2: Waste rock dump from the Kukla Mine
Source: Google maps

Originally there were three dumps covering approximately 5.5 hectares. Restoration began in 1987 and reduced the dump area to 3.5 ha. Technical work continued in 1992 and reduced dump cones fall into the depression between them. The following ecotechnical stage of reclamation moved into the biotechnical stage where the technology, using hydro-seeding, helped to grass over the entire area and trees, dominated by birch, and shrubby vegetation were planted. In the early 90's of the 20th century GEOCECH declared a 70% success rate of the hydro-seeding, a 60% success rate of the shrub communities existence and a 10–20% success rate of tree growth (Plchová, 2002). In 2005 remediation and reclamation of the site was completed. Currently the DIAMO company is the administrator of the adjacent area. In 2007 planning permission was given to change the land use to technical reclamation over the next 20 years. During this period approximately 100,000 cubic meters of matter will be removed from the dump and will be used for road construction.

Fig. 3: Waste rock removing from the former Kukla Mine area
Source: Hana Svatoňová

The total height of the dump will be reduced from 292.75 meters above sea level to 283.45 meters. The plan calls for it is not to exceed a 30 degree gradient between the reclaimed areas and to maintain a heightened wall of 3.1 m from the southeast as increased protection against dust. Biological reclamation including afforestation will follow. The cost for liquidation of the consequences of mining, reclamation and rehabilitation of the areas in the years 1991 - 2005 was estimated by Diamo company at 347 million crowns. The current cost of reclamation including water treatment, monitoring and remediation up to 2021 is estimated at 248 million crowns.

Coal ash dump from the Oslavany Power Plant

The Oslavany Power Plant was built in response to a demand for cheaper and more economical sources of energy. The ow-quality coal that was burned, was almost unsalable, but provided sufficient power. Construction ran from 1911 - 1913 and was conducted by the German company AEG Union. In the 1930's the power plant was modernized and maximum power shifted from the original 49.8 MW to an impressive 115 MW. Attenuation of coal mining in 1993 caused a shutdown of the plant. Subsequently, some buildings were dismantled. Besides the imprint of those buildings on the landscape, there remains the unmistakable ash dump (Fig. 4).

Fig. 4: Coal ash dump from the closed Oslavany power plant
Source: Google maps

The ash dump itself offers a view of quite diverse vegetation communities, which are also diversified according to the cardinal points. The observable representatives are, for example, white birch, black poplar, aspen poplar, plum general, tamarisk, pine, maple, etc. Currently, the dump is owned by the PREFA Company which extracts ash (Fig. 5) used for the production of castle tiles, panels and blocks. Of course, this also implies increased dustiness. In this case, however, we cannot talk about any strategies for restoration but only a business plan which would result in reclamation.


Fig. 5: Coal ash removal by Prefa company
Source: Hana Svatoňová

In addition to the above-mentioned dump, ash storage is located on the southeast edge of town near the power plant. After the closure of the power plant an ecotechnical phase was carried out and a flood control system in the form of a dry polder was built. Its purpose is to catch heavy rainfall. A self storage area occupies approximately 10 hectares and the level of driftwood ash and slag extends 0.5 m below the upper dam storage. On the surface of storage area, which is partly covered with gravel and grass, there are self-seeded trees and shrubs and a test planting of saplings was applied.

PERCEPTION OF THE STATE OF THE ENVIRONMENT BY THE INHABITANTS OF OSLAVANY

Reclamation and revitalization measures are not implemented not only for new types of land use, but also because of environmental improvement. For a better understanding of the previous information in a more concrete framework, we carried out a questionnaire survey of the Oslavany residents to determine their perception of the environment. The purpose of the survey was to determine their opinions about the changes that have occurred during the last 20 years.

Individual questions were thematically divided into 4 basic groups:

1) assessment of air quality,

2) the state of watercourses and water management activities in the municipalities,
3) the state of public access areas in the municipality,
4) the status of forest and agricultural land outside the village.

On the issue of air quality, 54.9 % of the inhabitants agreed that the overall condition has improved. One of the main factors that has affected the air quality is almost certainly the change in home heating furnaces (gasification) (71.3% of the population).

People negatively evaluated the rising number of motor vehicles transiting the city (67.7 % of the respondents), which have worsened not only local air quality, but also security on the roads.

Respondents positively evaluated the influence of the termination of the original industrial production in the city (54.7%), but another 40.4 % of the respondents think that the change has neither a positive nor negative effect. This answer is associated with the last question related to the emergence of new industrial zones, where 85.4 % of the respondents again did not see either a positive or negative effect. Likewise, the abandonment of agriculture and the emergence of large-scale agribusiness are not assessed as having a prevailing positive or negative impact on air quality.

According to 51.9% of the respondents, the quality of watercourses did not change. Most of the factors have had neither a positive nor negative effect on the current status of water quality. The only factor that positively affected the status of water quality was the upgrading of the sewage system and connection to the sewage treatment plant. This was confirmed by 68 % of the respondents.

Then we questioned the status of publicly accessible areas in the village which has, according to 71.3% of respondents, improved. An irreplaceable positive contribution, according to nearly 80% of the respondents, was the establishment of waste collection containers. Finally, the status of water quality was considered to be affected by the periodic liquidation of illegal dumps (by 52.3 % of the respondents) from which hazardous substances could leak into the soil and then into waterways.

On the issue of forest and agricultural land outside the village, the situation had not changed according to 54.8 % of the respondents. The situation could be positively affected by the establishment of municipal waste collection containers (by 64.1 % of the respondents), by the establishment of separate waste collection points or collection yards (by 68.2 % of the respondents) and by the periodic liquidation of illegal dumps (by 45.1 % of those surveyed). On the contrary, the liquidation does not affect the area either positively or negatively (by to 48 % of the respondents). Likewise, the status of forest and agricultural land outside the city is not positively or negatively affected by the reduction of arable land (66.4 % of respondents), the change of ownership of these lands (53 % of the respondents) or the management of the access roads to these areas (57, 8 % of respondents).

CONCLUSION

In the example of the two man-made forms of relief we can observe relatively similar approaches that result in secondary use of stored material which no longer interfere with the results of the original reclamation. Both contained a technical and biological part of the reclamation process, and many vegetation formations had reached certain successional stages. From the perspective of the overall regeneration of generated brownfields, such action is not necessarily needed. Although the Prefa Company plans to use the whole ash dump, the dump of the former Kukla Mine will decrease only by about 9.3 meters. The question of whether this unfinished regeneration, with increased noise and dust, is worthwhile for Oslavany residents will be answered later. In the questionnaire survey most residents did not mention these aspects, but took into account especially trendy issues such as increased car traffic and positive feedback to address waste issues.

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Současné přístupy aplikované v rámci revitalizace krajiny v bývalých těžebních oblastech postindustriální krajiny Oslavanska

Snaha o odstranění škod po ukončení důlní činnosti má v České republice více než 150 let dlouhou tradici. Vývoj pohledů na opětovné využívání a oživení krajiny se odráží i v termínech rekultivace, revitalizace a resocializace. Nejvýraznějšími příklady snah o rekonstrukci krajiny po těžbě jsou především povrchové Severočeské dobývací prostory. Příkladem menšího postindustriálního prostoru po ukončení hlubinné těžby je oblast Rosicko-Oslavanska, kde vlastní těžba a spalování uhlí v oslavanské elektrárně bylo ukončeno v roce 1993. Halda hlušiny z hlubinného dolu Kukla v Oslavanech byla rekultivována (zatravnění, vysázení keřů a stromů), nyní je však hlušina druhotně využívána a z haldy odebírána. Třídění materiálů, odvoz těžkou technikou a další technické práce narušily již rekultivované plochy včetně přirozeného postupu vegetace. Halda popílku po spalování uhlí je ve vlastnictví soukromé firmy (Prefa, a.s.), která popílek a strusku využívá jako plnidlo do panelů a tvárnic. Postupně je tak odebírán materiál z haldy, jejíž aktivní stěna je zdrojem prachu pro město Oslavany. Na prozatím nedotknutých částech svahů haldy je uchycena vegetace vytvářející pestrá vegetační společenstva, která se navíc diverzifikují podle světových stran. V dotazníkovém šetření mezi obyvateli Oslavan týkající se jejich vnímání stavu životního prostředí se neprojevilo negativní vnímání popílku jako zdroje znečištění ovzduší, celkově obyvatelé vnímají spíše trendové jevy týkající se rostoucí dopravy (negativně), odpadového hospodářství (kladně) apod.

CHARACTER OF SITES FORMED IN THE LAST 30 YERS ON THE INDUSTRIAL DUMP OF TECHNOLOGICAL WASTE (LÚŽENEC) BY NICKEL PRODUCTION AT SEREĎ IN THE SLOVAK REPUBLIC

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Abstract: *The body of industrial dump of technological waste of lúženec at the former Nickel smelting plant in Sereď can be divided according to the current state into four physiognomically different units. Since 1993, when there was a liquidation of nickel* *smelting plant, the industrial dump was partly formed by recultivation process, and partly by process of new anthropogenic activity-mining. The rest of the industrial dump body succumbed to the process of succession in the form of islands – patches with incoherent vegetation directly on the dump and more coherent grass and tree vegetation in the adjacent areas of creeping lúženec (dominated by Populus canescens mixed with Populus tremula and Betula verrucosa with Calamagrostis epigejos in the undergrowth). Recultivated part of the dump body is covered mostly by herbaceous-grass vegetation, represented by monocenosis of Artemisia absinthium. Uncovered areas of mining represent about 40 % of total area of the dump. According to chemical-technological analyses of lúženec, it is a granulometric and very fine material, in which 97% are fractions smaller than 0.1 mm and it contains about 77.8 % of iron, 2.5 - 3.5% of* $Cr_2 O_3$*, 6-8% of* SiO_2*, 6 - 8% of* $Al_2 O_3$*, 2.5 - 3.5% of CaO, 0.6 - 0.18% of* P_2O_3*, 0.28 - 0.3% of Ni. Composition of lúženec is reflected in the content of the aforementioned substances in soils cover and in the present vegetation cover at particular sites.*

Key words: *sites, technological waste, lúženec, industrial dump, Sereď*

INTRODUCTION

The lúženec dump and its surrounding represent, from the environmental point of view, strongly damaged area, which is not ecologically handled but left to the natural self-cleaning landscape ability. The condition of environment after 30 years of the existence of the smelting plant confirms, that the investor (the state) did not solve the waste problem and did not consider the fact regarding the nickel content occuring in one tonne of imported Albanian laterite iron-nickel ore (1 %). Annual production of metal (3. 000 tonnes of nickel) presented 1 % from annual production of waste (300. 000 tonnes of lúženec containing 5.625 tonnes of chemicals).

STUDY AREA

The industrial dump of the metallurgical waste of lúženec is situated at the border of the cadastral territories of Sereď and Dolná Streda on Dolnovážska flood plain of Podunajská plain (Mazúr, Lukniš, 1980) in 125 m altitude, between a railway connecting Sereď – Galanta, number 133 and the area of former Nickel smelting plant, 250 m to the north of the motorway E 58.

Fig. 1: Satellite image of study area – nickel smelting plant in Sereď.
Source: © LANDSAT, 2007

METHODOLOGY

Metodology starts from the analysis of the present day area structure. On the basis of the terrain investigation and chemical analysis of the anthropogenic soil samples there were defined the site signs of the location. Using the interpretation of the colourful satellite orthophotographs in high resolution from 2007 (Fig. 1) and digitalization of the spatial data , there were identified 5 types of nanogeochora in lúženec dump from the aspect of vertical and horizontal dump structure.

PRIMARY LANDSCAPE STRUCTURE

The area under investigation is a part of intramountainous lowland landscape of the temperate climate (Mazúr, Krippel, Porubský, Tarábek, 1980). The space of Dolnovážska flood plain under the dump is constituted of fluvial clay-sandy and clay holocene sediments with thickeness from 10 to 12 m (Maglay et al. 2005). The lúženec dump is situated on this subbase without any isolation provided. From petrographic composition point of view lúženec is a homogeneous body, a granulometric, fine matter of black colour. It was originated by grinding and washing the Albanian laterite iron-nickel ore (present day volume of the dump is 6.5 million tonnes).

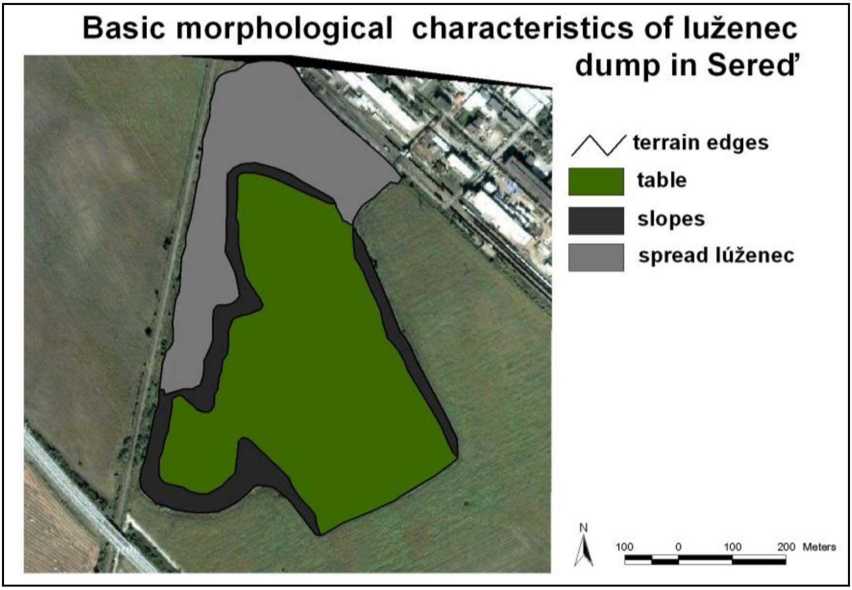

Fig. 2: Basic morphological characteristics of luženec dump in Sereď.

The basic type of the relief (Fig. 2) there is an anthropically modificated erosive-accumulated relief of fluvial plains with a striking superficial convex fire-resistant form of lúženec dump (Zapletal 1976, Lacika 1999), which was originated from accumulation of the metallurgical production waste (the height of the dump is 35 m). Its shape is of a table with wide, slightly broken terrain, bordered with steep slopes (sloping 10-45º). Lúženec is a pelletic matter, which is at present a subject of rather fast slope gravitational, fluvial and anthropogenic processes, which gradually change the original shape of the dump, mostly in the areas without coherent vegetation. The slope gravitational processes include creeping, fluvial processes include sheet erosion, water ditch and rain-water flow erosion (both processes proceed mutually), eolic processes include deflation and anthropogenic processes include predominantly mining, which accelerates all above mentioned processes. The most significant geomorphologic process is a rain-water flow. Precipitation water and water from melting snow and sprinkle water are gradually concentrated into the water ditch with their orientation in the direction of the biggest sloping of the dump slopes and the table and originate numerous of small and deeper water ditches in lúženec (on the table 10-20-30 cm). The gullies are originated on the slopes (the depth 70–150 cm). Deflation occurs in the areas damaged by mining and in the rest areas, which are not covered by vegetation (40 %). The siltation of polymetallic dust into the vast surroundings occurs, mainly in Sereď and Dolná Streda.

According to the climatic regionalization of Slovakia, the area under investigation belongs into the warm climatic region (Atlas krajiny SR 2002, map 27). It is situated in the climatic area T2, which is warm, dry with temperate winter. Annual precipitation ammount is 550 mm (annual precipitation shortage 100 - 150 mm) in Sereď. Lúženec is characteristic with a high penetration and precipitation soaks fast into the subbase. Annual average number of summer days is more than 60, average number of days with snow cover is 40. The area is significant with high number of sunshine (2000). Predominant air circulation is SE and NW wind (50.2 %).

Lúženec dump is situated between the Váh river and the stream Derňa. Underground water collectors are in the depth 2 - 3.5 m under the surface of flood plain sediments. The soil cover is presented by anthropogenic soils, (Anthropo-Skeletic Leptosols). The dump on the Podunajská plain is an extraneuos substance, formed by anthropogenic activity and which is surrounded by areas of industrial and agricultural landscape. There is a metahemerobic vegatation (Jurko, 1990) on toxic industrial waste.

Rašelinové závody, n. p Bratislava realized the antierosive sprinkler of the dump in 1976–1980 (the price was 1.385 000 Kčs) and simultaneously realized an attempt to grass the area, which was not, unfortunately, successful. A part of the dump was biologically recultivated in 1993 and 1994 (Blaško, 1994). For recultivation was lúženec mixed with washing ground, saturation sugar beet mud from Sugar factory Sereď and Sládkovičovo and with waste from ČOV in Šaľa.

SECONDARY LANDSCAPE STRUCTURE

Secondary structure of the landscape represents the complex of physical elements, which currently space the earth surface. Newly made artificial elements produced by human activities can be integrated into this cathegory as well. The territory under investigation belongs to them. The target of the investigation was to remark these characteristics of the territory, significantly changed by human activities, which make its difference from dynamic natural system of the surrounding landscape. The structure of the dump is determined by its site signs and these are the subject of our article.

Since 1993, when nickel smelting plant was liquidated, the anthropogenic body of the dump has been formed by recultivating process, geomorphologic processes, and by the process of anthropogenic activity, mining. According to the character of the secondary structure the dump was divided into five physiognomically different nanogeochoras: 1 nanogeochora of the table and slopes of the dump with mining, 2 nanogeochora of massive dump slopes, 3 nanogeochora of recultivated area, 4 nanogeochora of the dump surface with tree vegetation, 5 nanogeochora of the spread lúženec (Fig. 3).

1 nanogeochora of the table and slopes of the dump with mining: the sloping of the dump table is 1-10º, the sloping changes daily according to the mining frequency (annual mining capacity is 6, 000 tonnes), the surface of the nanogeochora is formed by minig machinery, by natural processes – mainly by deflation, less by erosion, there is no vegetation overgrowth, small areas of plants, a few decimetres, occur only sporadically , they are only relics (*Dactylis glomerata, Poa pratensis and Festuca rubra)* after unsuccessful hydroseeding process by Rašelinové závody in 1976-1978 and 1980. According to the chemical analysis of anthropogenic soil (150 m altitude) in one kiligram of lúženec there are 2,920 mg of Ni, 24, 300 mg of Cr, 300 mg of Zn, 49 of mg Cu. The content of Al_2O_3 is 3.3 % and the content of Fe_2O_3 is 78 %. The content of the fraction below 0.01 mm is 11 %, pH 8.3 - strongly alkaline, no humus soil. The area is the biggest source of polymetallic dust, which influences human organism in mechanic, toxic way, causes alergies and has carcinogenic effect (Ni and Cr). Pure lúženec has a low water capacity, high evaporation and temperature (34 ºC), low content of K and P.

2 nanogeochora of marked dump slopes: the dump slopes are short and steep with sloping 40-45°, formed by creep, linear erosion, deflation without or with a weak vegetation cover. Vegetation is sporadically occured by succession more in the east slopes, the south and the west slopes are too warm. Deep (1.5 – 2.5 m) gullies are in the some places wide-spread, water ditches are usually shallow. Aeroxystas were originated here by deflation. According to the chemical analysis of anthropogenic soil (the probe 135 altitude) the soil is strongly alkaline (pH 8.3), no humus soil (C : N = 0.96 : 0.06) with high content of Fe_2O_3 (74.5 % to one kilogram of soil), content of Ni is 3, 151 mg/kg, Cr 21, 880 mg/kg. Content of Al_2O_3 3.10 %, Cu 73 mg/kg and Zn 330 mg/kg. The contribution of the fraction below 0.01 mm is 12 %. The anthopogenic soil horizon is markedly mellow (in all extant 80 cm) and predisposed to the erosion (the soil horizon is a subject to the rejuvenation).

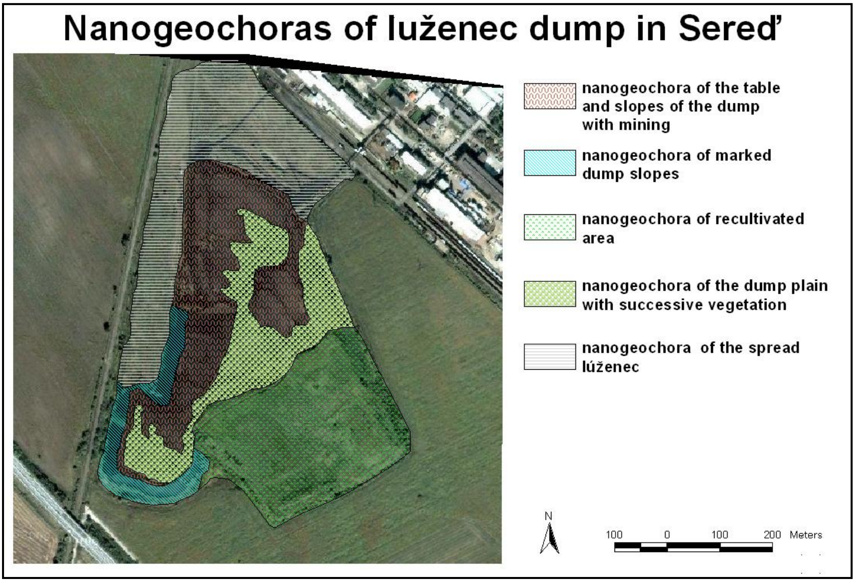

Fig. 3: Nanogeochoras of luženec dump in Sereď.

3 nanogeochora of recultivated area: occupies approximately 8 ha of the dump. It has flat, slightly sloping surface (3 - 10°). In the marginal part (SE) there are shallow and sloppy depressions. From the vegetation cover point of view, this area is not homogeneous, there are predominantly localities with grass overgrowth, smaller areas in depressions are covered with *Fragmites communis*. Recultivated part of the body is predominantly covered with herb-grass vegetation, presented by monocoenosis of *Artemisia absinthium*. Experiments of The Institute of experimental biology and ecology of SAS in Bratislava follow that pure lúženec has the worst properties for recultivation but with addition of 20% of saturation sugar beet mud (it contains a high proportion of organic remains and $CaCO_3$), washing ground and the waste from the sewage tank there was done a recultivation of the dump in 1993/1994 and there was originated a thick grass overgrowth (*Festuca rupicola, Dactylis glomerata, Lolium perenne, Arrhenatherum elatus* and others). Chemical analysis (probes 3, 4, 5, 6, 131 - 159 m altitudes.) shows the different character of anthropogenic soils from the previous nanogeochoras. The soil is neutral in humus horizon, neutral, grey-black, slightly alkaline (pH 7.5 – 7.8). The content of organic carbon varies in a range between

4. 8 – 10 % and the proportion of C : Ni is 15.5 : 1.25, markedly blanched horizon with moderate to the strongly alkaline (pH 8.2 – 8.8) occurs under the humus horizon. The proportion of Fe_2O_3 falls down to 43 % till 8 % (blanched horizon) and the content of Ni and Cr falls down to the half or one third in comparison to the previous localities, similarly the content of Cu and Zn. There is increased proportion of the fraction below 0.01 mm to 27 – 47 % . On the basis of the probes there is lúženec, which according to the chemical analysis has the same characteristics as in nanogeochora 1. Changes in the profile of the anthropogenic soils, from the content of heavy metals point of view, is possible to explain with the mixture of above mentioned recultivation soils.

4 nanogeochora of the dump plain with successive vegetation: nanogeochora occupies the space on the dump, which is situated between nanogeochoras of the recultivated area and the mining area. It is represented by the table, slightly degrading with microforms. Vegetation cover is formed by *Populus canescens* and *Populus tremula* at incoherent spacing. The undergrowth is formed by *Calamagrostis epigejos* and other herbs. Anthropogenic soil is moderate to strongly alkaline (pH 7.9 – 8. 36), no humus with total proportion of $Fe2O_3$ 75-76 %. Ni in superficial horizon is 2,655 mg/kg, in sub-superficial horizon it is higher proportion, 3.061 mg/ kg and Cr is represented by approximately similar amount 22, 600 mg/kg. The percentage of the fraction below 0.01 mm je 11–8.6 %. There is no blanched horizon, the soil is in its whole relief markedly black.

5 nanogeochora of the spread lúženec: occupies the area at the dump foothill in the west, north and north-east part. The surface of the area is formed by anthropogenic activity. All varieties of the relief microforms occur there (depressions, small elevation, gullies etc.) Vegetation cover reaches 60 -80 % and occuring kinds show higher abundance and dominance. Wood species are represented by *Populus canascens, Populus tremula, Betula verrcucosa.* Taproot plants are represented by *Cardaria draba, Carduus acanthoides, Convolvulus arvensis.* Ruderal kinds *Agropyrum repens, Artemisia vulgaris, Reseda luteta* are characteristic for this area. Anthropogenic soils have the similar profile and character as genochoras of recultivated areas. There are arable soils in the close vicinity of the dump in Sereď and Dolná Streda. According to the results of the investigation performed by VÚPOP Bratislave, signicicant part of these soils is contaminated by excessive content of Ni and Cr and most of the sites should be excluded from the agricultural soil fund.

CONCLUSION

The lúženec dump in Sereď is possible to settle approximately in 1. 000 years at the present speed of mining (6. 000 tonnes per year). The most important problem is spreading of the toxic polymetallic dust from the areas which are not covered by vegetation and contamination of underground, surface waters and soils. Technologies of phytoremediation regarding the lúženec amount are faint in this area. They can be used only in further vicinity, in agricultural soils. Processing of lúženec with help of microwave vitrification is a new and prospective method, but it is demanding as regards finances. This method is based on stabilization of dangerous elements by their transformation into vitreous, glassy material at high temperature – over 1.000 ºC (it is also necessary to take into account the waste amount). Minimal reconstruction of the dump, which could solve polymetallic dust emission is to grass the area by the above mentioned technology, but the dump is a private property and the law on environmental stress has not been adopted in The Slovak Republic yet. The production of nickel and cobalt in NHS š. p. Sereď finished and thus finished also the main source of contamination, but pollution does not disappear itself, it is still persisting.

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Charakter stanovíšť na primyselnej halde technologického odpadu lúženca při bývalej niklovej hute v Seredi v Slovenskej republike sformovaných za ostatných 30 rokov

Skládka lúženca v Seredi a jej okolie predstavuje z aspektu životného prostredia územie silne narušené, ekologicky neriešené, ponechané na samočistiacu schopnosť prírodnej krajiny. Stav životného prostredia po 30 ročnej existencii hutníckeho závodu potvrdzuje, že investor (štát) neriešil problematiku odpadov a nezvážil fakt o obsahu niklu v tone dovážanej albánskej lateritickej železoniklovej rudy (1 %). Ročná produkcia kovu (3 000 t niklu) predstavovala 1 % z ročnej produkcie odpadu (300 000 t, 5 625 t chemikálií).

Od roku 1993, kedy došlo k likvidácii niklovej huty, bolo antropické teleso skládky formované rekultivačným procesom, geomorfologickými procesmi a procesom antropogénnej činnosti, ťažbou (Obr. 2). Na základe terénneho výskumu a chemických analýz vzoriek technozemí boli určené topické znaky lokácie. Využitím interpretácie farebnej satelitnej ortofotosnímky s vysokým rozlíšením z r. 2007 (Obr. 1) a digitalizáciou priestorových údajov sme na skládke lúženca z aspektu vertikálnej a horizontálnej štruktúry skládky identifikovali 5 typov fyziognomicky odlišných nanogeochor (Obr. 3): 1 nanogeochóra plošiny a svahov skládky s ťažbou, 2 nanogeochora výrazných svahov skládky, 3 nanogeochora rekultivovanej plochy, 4 nanogeochora povrchu skládky so stromovou vegetáciou, 5 nanogeochora na rozvlečenom lúženci.

Haldu lúženca v Seredi pri súčasnom tempe ťažby (6 000 t ročne) možno zlikvidovať približne za 1 000 rokov. Najvážnejším problémom je šírenie toxického polymetalického prachu z plôch nepokrytých vegetáciou do širokého okolia a kontaminácia podzemných, povrchových vôd a pôd. Technológie fytoremediácie, vzhľadom no množstvo lúženca sú v tomto priestore bezpredmetné, dajú sa využiť v širšom okolí na poľnohospodárskych pôdach. Spracovanie lúženca pomocou mikrovlnnej vitrifikácie je nová perspektívna metóda, ale finančne náročná, ktorá

spočíva v stabilizácii nebezpečných látok premenou na sklovitý materiál pri vysokej teplote nad 1 000º C a ten je vysoko odolný proti pôsobeniu vody a vetra (opäť je potrebné brať do úvahy množstvo odpadu). Minimálna sanácia haldy, ktorá by vyriešila emisie polymetalického prachu je zatrávnenie vyššie uvedenou technológiou, ale skládka je súkromným majetkom a zákon o environmentálnych záťažiach nebol v Slovenskej republike doposiaľ prijatý. Ukončením výroby niklu a kobaltu v NHS š.p. Sereď zanikol síce hlavný zdroj kontaminácie, ale znečistenie určite nezanikne samo, pretrváva.

ANALYSIS OF SOLID MUNICIPAL WASTE IN THE SPRING SEASON IN SELECTED VILLAGES OF THE ZLATÉ MORAVCE DISTRICT

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Abstract: *Introduction of separate waste collection is currently topical issues that are increasingly gaining prominence. Its implementation is still problematic. To design an efficient system of doing it is necessary to know the real composition of municipal waste in different towns. It is therefore essential realization of municipal waste composition analysis. In our paper we describe an analysis of municipal solid waste for the purpose of introducing separate waste collection in selected villages of the district Zlaté Moravce.*

Keywords: *separate waste collection, analysis of municipal solid waste*

INTRODUCTION

Separate waste collection is currently topical issue which increasingly gains prominence. Many wastes, arising either from industrial or municipal activities, are still useful, therefore, recoverable. By the use of recycling on the one hand, we can save raw materials, fuels and energy and on the other hand, it reduces the burden on the environment, arising as it is sent to landfill (Končalová, Dubcová, 2010). Its implementation is still problematic. In recent years, the major obstacles of separate collection were weak financial motivation for the separation, the high cost of its implementation, the anonymity of separate collection and low environmental awareness and behavior of the population (Končalová, Dubcová, 2011).

To design an effective system of such collection in regions, it is necessary to know the real composition of municipal waste in individual municipalities. It is therefore necessary to realize the analysis of the composition of municipal waste. In our paper we describe the analysis of municipal solid waste for the purpose of introducing separate waste collection in selected villages of the Zlaté Moravce District. As the first step in the introduction of separate collection, it is necessary to assess the actual amount of waste generated in the individual municipalities and to know its structure based on which it is possible to make an analysis of municipal solid waste. For this purpose, there is no standardized methodology on the national or European level which would generate the required data (Kaufman, Báreková, 2010).

With the introduction of separate waste collection in smaller areas (municipalities, districts), the most effective is considered the methodology according to Kotoulová (2001). This is mainly because of its feasibility and its easy implementation in the field. The results are characterized by the effective applicability in the design of separate collection systems. Analysis of municipal solid waste in general is such analysis which aims to evaluate the composition of municipal waste on a percentage of the components of the waste (Vachanová, 2010). Implementation of this analysis is now necessary also in the district of Zlaté Moravce, because there is a plan to introduce separate collection of waste, for which it is very important to identify which commodities have the highest representation in the composition of municipal solid waste.

INTRODUCTION OF SEPARATE WASTE COLLECTION IN THE DISTRICT OF ZLATÉ MORAVCE

The town plans to start the collecting yard which will store and sort the municipal waste. This collection has to serve the needs of the municipalities of the district. The waste from up to 38 villages should be stored in the town of Zlaté Moravce. Municipalities will participate in an adequate amount of conveying waste. Collection yard will be in line with the trend in waste management. It should be created in the current urban area of the landfill. Technical Services of the Zlaté Moravce Town will be responsible for waste collection from municipalities, its sorting and processing. Municipalities have therefore no responsibility for the project documentation and for land and construction administration. The town will collect from the surrounding villages the separated waste such as paper, glass or plastic. The construction of collecting yard will begin at the beginning of the year 2012. Its capacity will be 12,000 tons of waste per year, but it should be gradually increased to 30,000 tons of waste annually. It is assumed that in addition to municipal waste, there will be from 60 to 70 % of the waste which would come from surrounding villages (Holúbek, 2011).

For the purpose of the introduction of separate waste collection in the district of Zlaté Moravce and analysis of solid municipal waste, we chose the methodology of Kotoulová (2001). The time period for the analysis is recommended at 12 months. It was elected a cycle of seasons that means the realization of four analyzes during the year. Thus, we achieve a representative composition of municipal waste within one calendar year with regard to seasonality. The methodology defines 9 components of municipal waste from which paper, plastics, glass and metals have three degrees of separation and biological waste and dangerous waste are have one degree of separation. Waste is also divided by size and that is the waste with fraction of the size of over 40 mm and other fine waste with three sizing fractions of 40 to 20 mm, 20-8 mm and less than 8 mm (Tab. 1).

Analysis of municipal solid waste was realized in the town of Zlaté Moravce and in five villages (Tesárske Mlyňany, Žitavany, Topoľčianky Vieska nad Žitavou and Červený Hrádok). Selection of municipal waste in each village was random. In each village, however, was selected one household with two containers. According to this, samples were processed with a weight from 18 to 33 kg.

ANALYSIS OF SOLID WASTE IN THE SPRING SEASON

The analysis of municipal solid waste was conducted based on samples and about the same volume. The largest representative sample we had available in the town of **Zlaté Moravce** - 32.1 kg. The most represented component was the waste bio-waste (46 %) and despite the fact that the sample came from the urban environment. Bio-waste was represented mostly by kitchen waste. The second largest component was the paper – 21 % largely represented by the print media (newspapers, magazines) and paper packaging. Another large component was plastic – 11 %. These were mainly represented by PET bottles. In this sample, followed the combustible waste (leather, rubber, hygienic products) – 7 %, glass – 6 %, textiles – 5 % and metals – 4 %. In this sample, there was no mineral and dangerous waste.

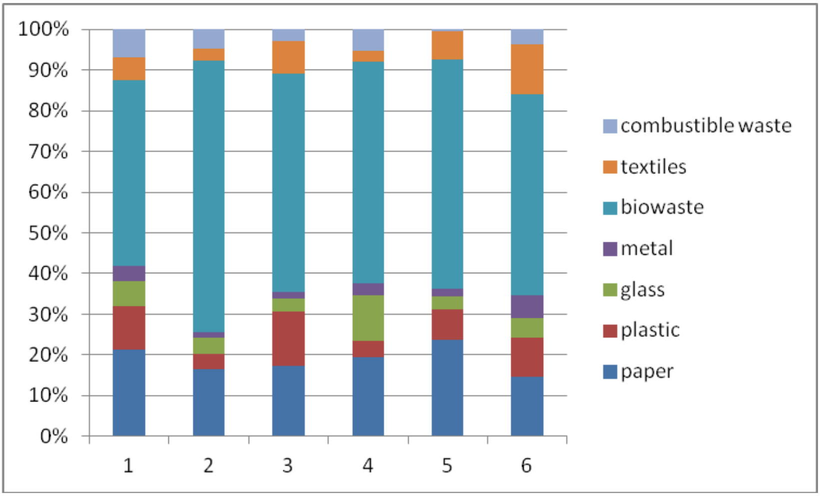
Another representative sample of waste was taken in the village of **Tesárske Mlyňany**. The sample weight was 23.7 kg and the largest representation was also bio-waste – 70 %. Although we had a smaller sample than in the town's waste, the biological waste was represented to a greater extent. Second largest component of the waste was paper (17 %) consisting mainly of newspapers and magazines. There was also 5 % of combustible waste (hygienic products), 4 % of brown and green glass and 3 % of plastics. The metals represented only (1 %).

The sample of municipal solid waste in the village of **Žitavany** weighed 20.9 kg. The bio-waste was not represented as much as in the previous samples, but still dominated (54 %). An important component was again paper – 17 %. Widely represented were also plastics – 13 %, textiles – 8 %, glass – 3 %, combustible waste – 3 % and metals – 2 %.

Topoľčianky is the largest within the compared villages and as the only has implemented the separate collection. Also here mixed components of waste were found in the sample in single collection container. It shows that municipality residents are still not identified with the separate collection of waste and not all of them are engaged in it. The composition of this sample was similar to previous samples - mostly biological waste (55 %), but in lesser extent than the other samples. Followed by paper – 23 % and glass – 11 %. There was also 5 % of combustible waste (hygienic products, leather, rubber, cork and wood) and 3 % textiles. The sample contained 3 % of the metals, but no mineral or dangerous waste.

Another sample taken in the spring analysis of municipal solid waste was sample from the village of **Vieska nad Žitavou** weighing 21.9 kg. Widely represented was the bio-waste exclusively kitchen waste which was also composed of a 55 % share as well as in the previous sample from the village of Topoľčianky. Surprisingly, in this sample there was no garden waste. There was also 23 % of paper comprising mainly of paper packaging, then ita was plastics (7 %), textiles (6 %), glass (3 %), metals (2 %) and combustible waste (2 %). A special feature of this sample was the presence of 2% of dangerous representing by ejected battery.

The last village, where we performed the analysis, was **Červený Hrádok**. The sample weighed 18.9 kg and the bio-waste was also the most represented (50 %). The relatively high proportion had also paper (15 %) and textiles (13 %). Textiles had even greater representation than plastics (8 %). In the composition of the waste followed the metals (6 %), glass (5 %) and combustible waste (3 %). In this sample there was no mineral or dangerous waste.



Graph 1: Composition of municipal solid waste in selected villages of the district Zlaté Moravce (1 – Zlaté Moravce, 2 – Tesárske Mlyňany, 3 – Žitavany, 4 – Topoľčianky, 5 – Vieska nad Žitavou, 6 – Červený Hrádok)
Zdroj: Končalová, 2011

CONCLUSION

Based on the analyses, it will be possible to obtain data on the composition of municipal waste for every season in 2011. From these data we can conclude the representative composition of municipal waste in the villages of the district of Zlaté Moravce. The data collected will be used as a basis for projecting the separate collection for the municipalities of the district which is now inevitable and it is ongoing throughout the European Union. In the future it is expected the continuous increase in the amount of separated waste at the expense of landfilling and incineration which corresponds with the global trend in waste management (Končalová, Dubcová, 2011b).

Based on the analysis of municipal solid waste undertaken in six villages of the district of Zlaté Moravce, we can say that the greatest extent in the samples was represented by bio-waste, paper and plastics. These results were roughly the same in all samples. The difference was also observed and monitored in the fullness of containers because the weightiest sample with 32.1 kg was obtained from the town of Zleté Moravce. In rural municipalities, the weight of the samples ranged from 18 to 23 kg.

The Slovak Republic still lags far behind the countries of the European Union in the use the waste energy that can no longer be used again or materially used. In our country we still consider the disposal of waste (landfilling and incineration) the most effective method of dealing with waste. This situation is alarming and in sharp contrast with the trend in the European Union where the waste is considered a major source of energy which is used for heat and power production (Končalová, Dubcová, 2011c).

Bio-waste and the amount of municipal waste are largely dependent on the season and seasonal work, especially in rural municipalities. It is therefore necessary to perform, the except the spring analysis, in all these villages also the summer, autumn and winter analysis of solid municipal waste.

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Analýza tuhého komunálneho odpadu vo vybraných obciach okresu Zlaté Moravce

V našom príspevku sa zaoberáme analýzou tuhého komunálneho odpadu pre účely zavedenia triedeného zberu odpadu vo vybraných obciach okresu Zlaté Moravce. Pre vytvorenie účinných systémov separovaného zberu odpadu je nevyhnutné pochopiť skutočné zloženie komunálneho odpadu.

Na základe našej analýzy v priebehu jarnej sezóny sme prišli k predbežnému záveru, že najpočetnejšiu zložkou tuhého komunálneho odpadu v sledovaných obciach bol biologický odpad, papier a plasty. Analýza bude vykonaná ešte v lete, na jeseň a v zime a na základe toho budeme schopní získať údaje o zložení komunálneho odpadu v každom ročnom období vo vybraných obciach okresu Zlaté Moravce v priebehu roka 2011.

CHANGES OF THE LANDSCAPE IN THE MORAVA RIVER FLOODPLAIN DURING THE PAST 175 YEARS

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Abstract: *This paper presents the results of the analysis of land use in the Morava River floodplain, CR from 1836 to the present (1999). Significant changes in land use occurred in the study area over the last 175 years. The most striking trend is the increase in arable land throughout the studied period of time. Dynamic enlargement of fields is reflected also in the spatial structure of the landscape. At the beginning of the studied period (in 1836) the landscape matrix of the Morava River floodplain was formed by meadows and forests. In the 1950' the landscape matrix was composed of a mosaic of alluvial forests, meadows and arable land. Currently, the predominant landscape matrix consists of arable land and isolated forest complexes. The area of settlements has also increased significantly over the studied period. The share of meadows and pastures declined in favor of arable land during the studied period and it is manifested by reduced environmental stability of the area, which is quantified by environmental stability coefficients. Land use changes in the Morava River floodplain are linked with changes in landscape character, landscape structure and biodiversity.*

Key words: *changes of landscape, GIS analysis, historical maps, floodplain, River Morava.*

INTRODUCTION

Research on the changes of land use is a basis for the studies of cultural landscape. The results of the research can be used e.g. for landscape and spatial planning and in the case of floodplains for the optimization of flood control measures. The study of changes in alluvial landscape is particularly timely in the context of the increasing frequency of flood events in alluvial plains of central European rivers.

The Morava River floodplain in the present status is an example of cultural landscape in which most ecosystems are affected by socio-economic activities of the human society. This paper gives an overview of the evolution of the Morava River floodplain during the past 170 years assessed through land use analyses performed using GIS (geographic information systems).

MATERIALS AND METHODS

Land use analysis on the scale of 1: 25 000 was used to evaluate land use changes in the Morava River floodplain. To assess the changes in the landscape, digital maps of the Morava River floodplain on the scale of 1: 25 000 were created for the time period from 1836 to 1840, from 1876 to 1880 and around 1953 (hereinafter referred to as "digital historical maps"). The maps were digitized and processed to vector layers using GIS ARC/INFO. Map sheets from the 2nd military mapping (1836 - 1840) and the 3rd military mapping (1876 - 1878) and State maps on the scale of 1: 5000 derived from the period around 1953 formed a cartographic basis for the digital historical maps.

The cartographic contents of the digital historical maps were compared with a digital map of the current land use of the Morava River floodplain and thus the information on the representation of all mapped land use categories in different time periods was obtained. This information was organized into a data system that allows analyzing changes in the evolution of the landscape and individual landscape elements in the studied period of time.

The digitization was followed by the processing of a detailed network of digitized lines. Each spot was assigned coordinates and an identifier to which additional descriptive information was linked. Using post-editation, each spot was then assigned information from the table of codes expressing the use of the area. Finally, the names of towns, forest units and water courses were created in the ArcView GIS attribute table. After further necessary topological adjustments a digital map was created, which could be then statistically analyzed using traditional GIS tools. Obtained statistical data (number of individual spots, their size, sum, length of water courses, etc.) were processed into tables and graphs that allowed interpretation of results.

STUDY AREA

Studied area represents the alluvial landscape of the Morava River in the Czech Republic (Fig. 1). The length of the Morava from its source to the confluence with the Dyje River at the border of the Czech Republic is about 270 km. The Morava River floodplain is only a few meters wide in the upper reaches and widens gradually towards the south along the river up to the width of several kilometers. The boundary of the studied area was formed by the boundary of the Quaternary fluvial sediments of the Morava River according to a geological map. The surface area of the studied floodplain was 635.7 km2, the elevation ranged from 900 m a.s.l. (narrow floodplain of the Morava in the Králický Sněžník Mts.) to 151 m a.s.l. (confluence of the Morava and Dyje rivers).

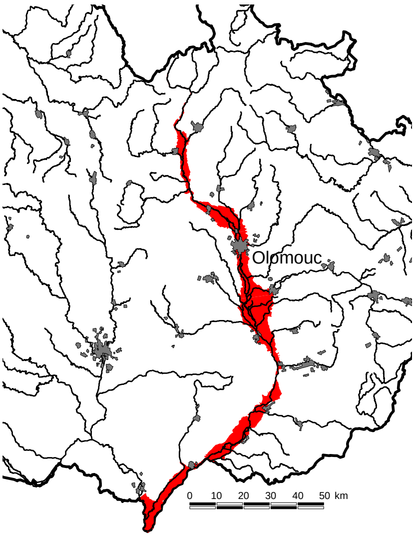

Fig. 1: Location of the studied area (the Morava River floodplain, Czech Republic)

RESULTS

In 1836, the Morava River floodplain was relatively well preserved from the ecological point of view. Most of the surface area was formed by meadows, pastures and forests. Arable land prevailed in the Morava River floodplain in the second half of the 20th century. A trend of a growing area of human settlements within the floodplain is discernible over the whole time period.

Changes of land use in the Morava River floodplain from 1836 till present are expressed by numbers in Table 1.

Tab. 1: Land use in the Morava River floodplain

	1836		1877		1953		1999	
	km^2	%	km^2	%	km^2	%	km^2	%
Forests	177,27	27,89	168,97	26,58	159,92	25,16	162,23	25,52
Meadows	273,52	43,03	222,61	35,02	179,26	28,20	53,86	8,47
Pastures	28,7	4,51	21,92	3,45	6,95	1,1	0	0,0
Arable land	136,65	21,5	196,78	30,95	235,94	37,11	329,28	51,8
Gardens and orchards	0,85	0,13	4,4	0,69	12,53	1,97	0,47	0,07
Towns	16,3	2,56	19,36	3,05	38,24	6,01	66,16	10,41
Transport areas	0,39	0,06	0,85	0,13	2,06	0,32	2,24	0,35
Water surface	2,02	0,32	0,81	0,13	0,8	0,13	21,46	3,38
Total	**635,7**	**100**	**635,7**	**100**	**635,7**	**100**	**635,7**	**100**

The table shows that spatial changes of different land use categories in the Morava River floodplain in different time periods are rather significant. Forests represent the most stable areas. The maximum decrease of their surface area by 17.35 km^2 (i.e. 2.73%) was recorded in 1953 as compared to the situation in 1836. At present, forests cover 25.52% of the Morava River floodplain. The area of forests decreased by about 1.4% between the time periods, however, the trend has reversed since 1953. Only one particular forest stand has been identified in the floodplain, which was cut down and has not been renewed (an unnamed forest south of the “Olšový les” near Moravský Písek). In all other cases the area of forest decreased as it was usually replaced by meadows or fields. Three stands are currently larger than at the beginning of the studied period ("V hájích" near Bohuslavice "Černovírský les" near Olomouc and "Olšový les" near Moravský Písek). Compared to the state in 1836, the number of hedgerows, balks and line forest stands declined slightly (estimated, not measured), however, most of them remain or have been renewed.

Meadows and pastures, which accounted for 273.52 km^2 (i.e. 43.03%) at the beginning of the studied period, almost disappeared from the alluvial landscape. Over time, their area has declined to only 53.86 km^2 (i.e. 8.47%).

The loss of these important landscape elements in the Morava River floodplain was caused by their conversion to arable land. The area of arable land increased 2.5 times during the studied time period (from 21.5% to 51.8%), which is a very significant increase. Furthermore, a substantial portion of arable land has been added in the last decades. In previous periods, the increase was not so marked (Fig. 2).

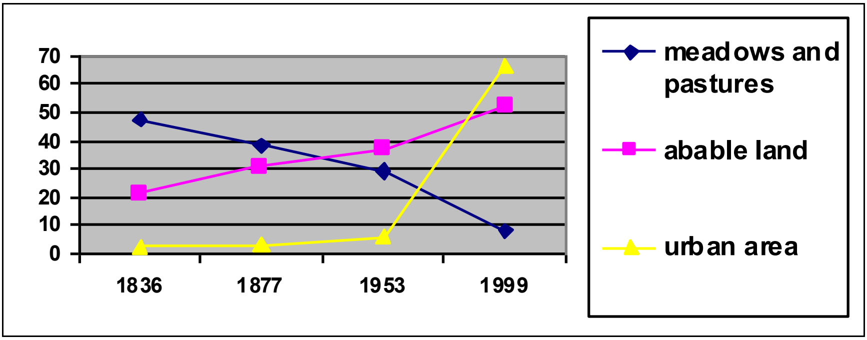

Fig. 2: Changes in the area of meadows, arable land and urban area in the Morava River floodplain

Huge increase of urban areas (settlements) was recorded. Their size increased from the original 16.3 km^2 (i.e. 2.56%) to 66.16 km^2 (i.e. 10.41%). The size of urban areas within the floodplain has increased sharply since the turn of the 19th and 20th century and especially in the second half of the 20th century. It can be explained by the development of industry, whose production facilities were located in the floodplain. Since the fifties, when large-scale agriculture originated and agriculture cooperatives were founded, the area of settlements has been enlarged by these economically and agriculturally used areas. Residential areas of towns and cities have expanded too, which is related to population growth and migration of people into towns and cities.

Traffic areas (railway stations and their adjacent transshipment and manipulation areas) were mapped within the built-up areas. Some railway stations, which were located outside of town in the 19th century, are now part of the urban area. New rail lines have been built during the studied period. The surface area of transport infrastructure has therefore increased from the original 0.06% (in 1836) to the current 0.35% of the floodplain area.

Comparison of the development of land use in the CR and the Morava River floodplain

The development of land use in the studied area has been influenced by natural processes and conditions specific to the floodplain, as well as social and economic conditions. These factors represent a possible cause of differences in the development of land use in the Czech Republic and in the studied area.

The first difference in the land use structure (Table 2) is very high percentage of meadows in the Morava River floodplain, which already in 1836/1845 exceeded Czech average by 33.73%. It can be explained by natural conditions – the floodplain with its high ground water level and frequent floods did not allow other uses. Waterlogged meadows provided fodder but it was not necessary, and probably not even technically possible, to cultivate (i.e. plow) them. This also explains low representation of arable land and its location in acceptable parts of the floodplain. The initial low share of forests in the floodplain is surprising and also the following development tendency is opposite if compared to the CR. Within the studied time period, the share of forests increased by 4.6% in the Czech Republic but decreased by 2.73% in the Morava River floodplain (status in 1953).

Tab.2: Comparison (in %) of the development of land use in the Morava River floodplain (MRF) and Czech Republic (CR)

	MRF	CR	MRF	CR	MRF	CR	MRF	CR
	1836	**1845**	**1877**	**1897**	**1953**	**1948**	**1999**	**1999**
Forests	27,89	28,8	26,58	28,9	25,16	30,2	25,52	33,4
Meadows	43,03	9,3	35,02	8,9	28,20	9,1	8,47	7,9
Pastures	4,51	8,3	3,45	5,3	1,1	3,8	0	3,4
Arable land	21,5	48,2	30,95	51,6	37,11	49,9	51,8	39,3
Gardens and orchards	0,13	1,1	0,69	1,5	1,97	1,9	0,07	3,0
Urban areas	2,62	0,6	3,18	0,7	6,33	1,1	10,76	1,96
Water surface	0,32	0,9	0,13	0,5	0,13	0,6	3,38	1,99
Other	0	2,8	0	3	0	3,4	0	9,05
Total	100	100	100	100	100	100	100	100

It is worth noting the fact that the share of built-up areas in the floodplain greatly exceeds their average share in the CR. It is five times higher even though some settlements are only partly situated within the floodplain. This fact can be explained by the location of ancient human dwellings and settlements in the proximity of rivers that were providing water and livelihood. The settlement structure is therefore denser in the floodplain and its neighbourhood if compared to the rest of the territory.

There are different trends in the development of individual forms of land use in the CR and the floodplain in the studied period. Significant loss of meadows and pastures in the Morava River floodplain and dramatic increase of the area of arable land, which currently exceeds the average share in the CR by 12.5%, indicate strong pressure of highly productive land use in recent decades. The area of arable land in the floodplain increased to 241% of the original area (status in 1836). In contrast, in the CR it decreased to 81.5% of the original area (status in 1845). Meadows and pastures represent very dynamic land use categories in the Morava River floodplain. Their area decreased to 17.8% of the original size, while the most significant decrease was recorded in the second half of the 20th century. The reduction of the area of forests, which were also transformed to arable land, has increased the difference in the share of forests in the floodplain and the CR. The trend of decreasing area of forests was reversed in the mid-19th century in the CR, the same cannot be said for the Morava River floodplain, where this trend had not reversed before 1953.

There is a gradual upward trend in the size of built-up areas in the CR, the size of built-up areas has increased to 326.5%. In the floodplain is has increased to 410%, while up to 1953 the area increased only to 240%. The significant jump in the area of settlements in the floodplain is dated in the last decades, when there was a significant development of industry, large-scale agriculture and housing construction. Flood risk was underestimated probably due to drier climatic conditions in the 20th century and the awareness of the water management paradigm. However, floods are a natural factor in the development of floodplains and their vegetation cover.

It is interesting to monitor the development of water bodies. In the CR, the area of lakes, reservoirs and ponds has increased to 221%, whereas in the Morava River floodplain they represent the most dynamic land use category. Their size has increased to 1056%. This huge increase is linked to the formation of water reservoirs in the areas of extracted fluvial sand and gravel, which were established in the floodplain in relation to the development of construction industry in recent decades.

DISCUSSION

The result of the analysis of the study area does not contradict the general trends of the landscape changes in the Czech Republic in the course of the 20th century [1]. According to, the ecological stability of the Morava River floodplain landscape decreased significantly over the course of the 20th century. However, the results of the analysis concern the landscape of the entire the Morava River floodplain which is predominantly deforested. The same applies to [2], who found a significant decrease in the landscape heterogeneity and shortening of the total length of permanent landscape structure edges (which he considers an important landscape characteristics for assessment of changes in ecological stability of the landscape) in the landscape of north Bohemia (in the Ohře riverbasin) which is subject to intensive agricultural cultivation.

When we compare the results of this study to the general developmental trends of the cultivated rural landscape in the Czech Republic, we can see that the overall landscape heterogeneity and ecological stability increased during the 20th century [3]. The change in the observed landscape attributes within the study area in the first half of the 20th century was triggered by the transition from the coppice with standards forest type to that of a high production forest [4]. The intensive and centuries-old forest management processes in the floodplain forests of the Morava River is a conditionally natural state of the floodplain forest geobiocenoses with unusually high biodiversity [5].

Fragmentation is especially challenging for European floodplain forests because they are endangered ecosystems with unusually high biodiversity [6], which at the same time are significantly anthropogenically conditioned [7]. The development dynamics of Central European floodplains is very quick [8], from which follows a very dynamic ecological stability in the floodplain themselves. This was described by BUČEK and LACINA [9] as the “dynamic fluvial seral section of floodplain biotopes” [10].

CONCLUSIONS

Land use changes in the Morava River floodplain affected the overall appearance of the landscape significantly. During the last 175 years the Morava River floodplain has changed from extensively used agricultural landscape with prevailing permanent grassland to intensively used agricultural landscape dominated by arable land. The trend of increasing size of built-up areas is also significant. By contrast, no fundamental changes in the share of forests were recorded in the Morava River floodplain throughout the studied period of time. The area of forests has been relatively stable over the last 150 years.

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Proměny krajiny údolní nivy řeky Moravy za posledních 200 let

Článek předkládá výsledky analýz land-use krajiny údolní nivy řeky Moravy v ČR od roku 1836 po konec 20. století (1999). Ve studovaném území došlo za posledních 175 let k výrazným změnám ve využití půdy. Nejvýraznějším trendem je nárůst ploch orné půdy během celého sledovaného období. Dynamika zvětšování rozlohy polí se projevuje i v prostorové struktuře krajiny. Na počátku sledovaného období (rok 1836) tvořily krajinnou matrici nivy řeky Moravy louky a lesy. V padesátých letech 20. století byla krajinná matrice nivy složena z mozaiky lesů, luk a orné půdy. V současnosti je převažující krajinná matrice nivy tvořena ornou půdou a izolovanými komplexy lesů. Významně se za sledované období také zvětšila plocha sídel. Pokles zastoupení luk a pastvin ve prospěch orné půdy za sledované období se projevuje snížením ekologické stability území, kvantifikované koeficienty ekologické stability. Změny využití půdy v nivě řeky Moravy zároveň souvisí se změnami krajinného rázu, krajinné struktury a biodiverzity.

PEDOGEOGRAPHIC CHARACTERISTICS OF SELECTED AREA

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Abstract: *The aim of the paper is pedogeographic characteristics of the selected area which lies on the boundary of the villages of Rišňovce and Rumanová and marginally in the village of Veľké Zálužie. This is area constantly affected by erosion-accumulation processes induced by water erosion conditioned by anthropogenic activity. The paper provides the basic pedogeographic characteristics of the area in terms of KPP (Komplexný Pôdoznalecký Prieskum = Comprehensive Soil Survey) and BPEJ (Bonitované Pôdno-Ekologické Jednotky = Bonity Soil-Ecological Units) mapping and own field research. It compares the changes in soil mosaic in the periods of mapping and also deals with the causal relationships of the current state of land cover.*

Key words: *water erosion, tillage erosion, soil, Chernozems, Haplic Luvisols, Regosols*

INTRODUCTION

Mapped area is one of the parts of Slovakia which with the influence of water erosion and tillage erosion changes the soil mosaic. Since in this type of erosion, the soil is eroded more or less evenly over the whole surface of land or a portion of the slope, the thickness of the soil cover decreases and on the large area exposes (denudation) the bedrock, the relief rounds, levels, and sets up. If it is added by the tillage erosion, which occurs everywhere on arable soils located on sloping lands, which is the movement of soil lump by tillage, often comes to soil degradation to the extent that the land loses its essential function - fertility. It is therefore necessary to monitor such soils. Interest in this area comes from the need to obtain information about the change of soil cover in the agriculturally used area from the period of the last KPP mapping (1960-1970) in Slovakia to the present. It is assumed that this area was affected by downslope tillage, but also along the contour, planting various kinds of agricultural crops apart from their anti-erosion effects. It was therefore interesting to see what consequences arose by such land use.

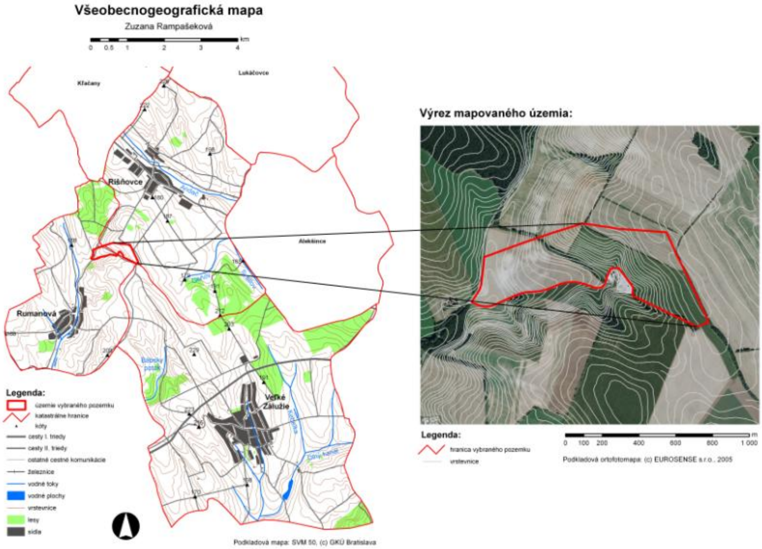
METHODS

In terms of determined aims of the paper, we elaborated the general geographic characteristics of mapped area according to the works (1,2,5,6). Pedogeographic characteristics in terms of KPP were elaborated according to works (3,4) and in terms of BPEJ (2,8). Field research was realized during the years 2009-2010 based on 111 pits in downslope direction each 70 meters.

STUDY AREA

The chosen mapped area lies in the agricultural land of the villages of Rišňovce and Rumanová and marginally in the village of Veľké Zálužie (Map 1). Administratively, it belongs to the Nitra District which lies in the Nitra Region. Mapped territory with the area of 36.77 hectares is managed by "Agrodružstvo Rišňovce" in the northeastern part and "Roľnícke družstvo (Agricultural cooperative) Rumanová" in the southwestern part.

Geologically, it lies on the boundary of loess and Neogene sediments. Geomorphologically, it belongs to Zálužianska pahorkatina (Zálužianska Upland) which is a part of sub-unit of Nitrianska pahorkatina (Nitrianska Upland). As for the climate, it belongs to warm and very dry lowland region. Watershed divide of river basins of the Nitra River and Váh River passes through the mapped area.



Map 1

PEDOGEOGRAPHIC CHARACTERISTICS ACCORDING TO KPP

Soil Types

According to Comprehensive Soil Survey (KPP) which was realized in the villages of Rišňovce and Rumanová in 1964 and elaborated in final report (5), the mapped area lies on the boundary of two dominant soil types of Haplic Luvisols (HM-24-H/H,0/0) and Chernozems (ČMk-18-H/H,0/0 and ČMk-24-H/H,0/0).

Haplic Luvisols

It dominates in the eastern part of mapped area and administratively belongs to the village of Rišňovce. It covers the area of 24.69 ha which is 67 % of the total area of mapped territory. In the State Property of Rišňovce were, in the area of 420 ha of agricultural soil during the field research in 1964, dug 24 basic and 2 selective pits from which only 1 basic pit (Z-405-BF) lies in the mapped area.

According to the KPP areas (Map 2), in the area there is larger *Haplic Luvisol on loess, clayey without soil skeleton in topsoil, clayey without soil skeleton in under-topsoil (HM-24-H/H,0/0).*

According to final report from 1966 (5), the study area is identified by the basic pit (Z-405-BF) which is according to field soil record *Haplic Luvisol clayey even loamy on the calcareous clay sediments of the Neogene sea (HM-4/5-18).* Based on the obtained data, there is a difference in granularity and in bedrock.

Chernozems

It dominates in the western part of the mapped area and has the area of 12.08 ha which is 33 % of the total mapped area. Administratively, this area belongs to the village of Rumanová. In the village of Rumanová were, during the field research of soils in 1966 on the area of 637.58 ha, dug 37 basic pits and 9 selective pits. Only one basic pit Z-1–BZ lies in the mapped area and characterizes the Chernozem.

According to Map 3, there are two localities in the area of Chernozems. The larger locality is the locality of *Calcaric Chernozem on loam calcic sediments of the Neogene sea (ČMk-18-H/H,0/0).* Its area has 10.92 ha which is 30 % of the total of mapped area. In the west, there is a smaller locality of *Calcaric Chernozem on loess (ČMk-24-H/H,0/0).* Its area is 1.16 ha representing 3 % of the total mapped area. This area is documented by one basic pit Z–1–BZ characterizing the *Calcaric Chernozem clayey on the loam sediments of the Neogene sea (ČMk-4/4-18)* localized in the northwestern part.

Soil Groups

Soil groups, from the viewpoint of granularity, depend on the subsoil on which they were made. According to Map 2, in the whole mapped area (36.77 ha) there are *clayey* soil groups which belong to the moderately heavy soils.

PEDOGEOGRAPHIC CHARACTERISTICS ACCORDING TO BPEJ

In the mapped area, there are 5 different localities of BPEJ (Map 2) and one locality 0144002 is represented two times.

The largest locality of Regosols (RMa) in the complex with Haplic Luvisol (HMa) – 0147402 is located in the central part. Its area is 23.71 ha representing 64 % of the mapped area.

- to the east, smaller localities spread. To the northeast, the locality of Haplic Luvisol (HMa) – 0144202 is localized with the area of 2.82 ha (8 %). To the southeast, the locality of Chernozem (ČMa) even Luvi-Haplic Chernozem (ČMah) – 0139002 with area of 4.06 ha (11 %) spreads,

- to the west from this locality, the locality of Regosol (RMa) in the complex with Chernozem Eroded ($ČMa^{e}$) – 0138402 is located with the area of 0.59 ha,
- the last BPEJ represents Haplic Luvisol (HMa) – 0144002 which can be found in two localities of mapped area and it is the second most represented locality with 5,59 ha (15 %).

In terms of the Act No. 220/2004 Coll. on the land protection and land use and amending Act No. 245/2003 Coll. on integrated environmental pollution prevention and control and amending certain laws (8), 9 groups of soil quality are listed, the first four groups are soils with increased protection when changing the type of land for non-agricultural purposes. In the study area, there are soils with the quality groups 2, 3, 5 and 6. Under the quoted acts, the mapped area contains three localities of increased protection. The locality of ČMa and ČMh placed in a quality group of BPEJ 2 (0139002) and two localities of HMa included in a quality group of BPEJ 3 (0144002, 0144202). We can state that in terms of the act the eastern part of the mapped area with 12.45 hectares, which is 34 % of the total area, belongs to the areas with increased protection.

Map 2

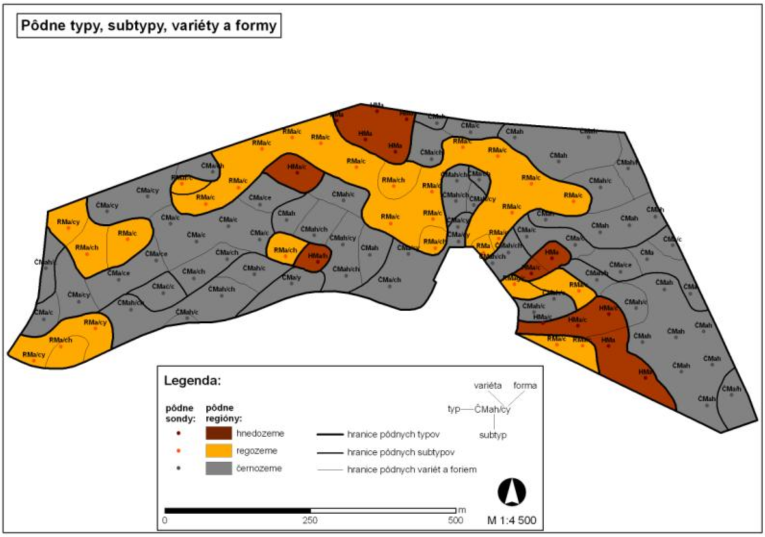
CURRENT PEDOGEOGRAPHIC CHARACTERISTICS ACCORDING TO FIELD RESEARCH

By the field research, we recognized three main soil units (Map 3): Haplic Luvisols (HMa), Chernozems (ČMa) and Regosols (RMa).

The largest locality seems to be the locality of **Chernozems** (ČM) with acreage of 22.82 hectares occupying 62 % of the mapped area. They are represented mainly by subtypes Chernozems (ČMa) and Luvi-Haplic Chernozems (ČMah). Chernozems are formed on loess substrate in the eastern part of the top platform and the slope with south-west orientation with 3-7°, predominantly on concave-convex (KV) to convex-concave (KK) forms of relief. They are connected mainly with the accumulative soil areas. In the western part of the mapped area, Chernozems were made under the influence of the same substrate and geomorphological or morphometric characteristics of relief. Because this part of mapped area is in the west and south bounded by valleys with slope of 0-1°, in terms of erosion-accumulation processes there were created not only accumulative, but even overlaid forms of Chernozems with the depth of humus horizon to 120 cm.

The second most represented locality is the locality of **Regosols** (RMa) with acreage of 10.37 hectares which is 28 % of the mapped area. They were created on inhomogeneous substrate of loess and Neogene sediments, on the slopes with the greatest slope 7-12° of convex-concave form of relief (VV), with a depth of humus horizon from 20 to 30 cm. In terms of morphometrics, they also connected to the convex-concave (KV) and concave-convex (KK) relief shapes with greater depth of humus horizon. In the southwestern part of the mapped area, they reach the depth up to 120 cm. These deep soil pits were evaluated by soil units of Regosols because the currently valid MKSP does not include the soil type of koluvizeme (KL), as proposed by Sobocká (7).

The smallest locality seems to be the locality of **Haplic Luvisols** (HMa) with an area of 3.58 hectares which is 10% of the mapped area. These soils are related to inhomogeneous substrate of loess and Neogene sediments and are considerably loamier as ČM and RM. They were created on the slopes of 3-7° and convex-concave (VV) form of relief.



Map 3

CONCLUSION

Mapped area with 36.77 hectares is spread on agricultural land in the villages of Rišňovce and Rumanová and marginally in the village of Veľké Zálužie (Map 1) which is managed by "Agrodružstvo Rišňovce" in the northeastern part and by "Roľnícke družstvo (Agricultural cooperative) Rumanová" in the southwestern part. From pedogeographic viewpoint, it is located at the intersection of two soil units of Haplic Luvisols and Chernozems.

Based on field results, there was a relatively large change in land cover in the course of 46 years. Comparable data are only KPP and field research while BPEJ methodology is based on KPP data and it is characterized by measurement of the soil. Mapped area, which according to KPP, was made by only two localities of soil units (Map 2) of Haplic Luvisols with the area of 24.69 ha (67 %) and Chernozems with the area 12.08 ha (33 %) has changed. The current land cover (Map 3) is mainly composed of **Chernozems** and **Haplic Luvisols on loess** with the area of 22.82 hectares which is 62 % of the total area. Compared with the KPP mapping (1964), there was an increase in the area by 10.74 hectares at the expense of Haplic Luvisols localities. At the expense of the Haplic Luvisols area, there was a new locality of **Regosols on loess and Neogene sediments** with the area of 10.37 hectares which is 28 % of the mapped area. The locality of **Haplic Luvisols mainly on Neogene**

sediments is represented only by 3.58 ha area which is 10 % of the territory. We assume that this condition was caused by climate changes in combination with the substrate, relief and human activities which are characterized by warmer and drier weather.

Poďakovanie: Príspevok bol vypracovaný v rámci riešenia projektu projektu VEGA 1/0893/11 Transformácia Nitrianskeho kraja v meniacich sa spoločensko-ekonomických podmienkach a perspektívy jeho regionálneho rozvoja.

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Pedogeografická charakteristika vybraného územia

Mapované územie o rozlohe 36,77ha rozprestierajúce sa v poľnohospodárskej krajine katastrov obcí Rišňovce a Rumanová a okrajovo sa dotýkace obce Veľké Zálužie (Map 1), ktoré je v severovýchodnej časti obhospodarované „Agrodružstvom Rišňovce“ a v juhozápadnej časti „Roľníckym družstvo Rumanová“ sa z pedogeografického hľadiska nachádza na styku dvoch pôdnych jednotiek hnedozeme a černozeme.

V zmysle mapovania KPP (Map 2), ktoré v danom území prebehlo v roku 1964 sa v predmetnom území nachádza vo východnej časti plošne rozsiahlejšia hnedozem na spraši s plochou 24,69ha (67%) a v západnej časti černozem karbonátová na neogénnych sedimentoch s plochou 12,08ha (33%).

V zmysle mapovania BPEJ, ktoré sa uskutočnilo v rokoch 1968-1972 z dôvodu bonitácie t.j. oceňovania pôd sa na mapovanom území vyskytujú tri pôdne jednotky. V centrálnej časti sa plošne najväčším javí areál regozeme kultizemnej v komplexe s hnedozemami kultizemnými a černozemami kultizemnými erodovanými na spraši s plochou 24,30ha (66%), v západnej a severovýchodnej časti sa nachádzajú areály hnedozeme kultizemnej na spraši s plochou 8,41ha (23%) a v juhovýchodnej časti areál černozeme kultizemnej v komplexe s černozemou kultizemnou hnedozemnou na spraši s plochou 4,06ha (11%).

Na základe terénneho výskumu, ktorý sa uskutočnil v rokoch 2009-2010 je súčasný pôdny kryt mapovaného územia tvorený troma pôdnymi jednotkami. Plošne najzastúpenejším sa javí areál černozeme kultizemnej na spraši s plochou 22,82ha (62%). Druhým sa javí areál regozeme kultizemnej na spraši a neogénnych sedimentoch (RMa) a plošne najmenším je areál hnedozeme kultizemnej na neogénnych sedimentoch s plochou 3,58ha (10%).

Z dosiahnutých výsledkov vyplýva, že v priebehu 46 rokov sa na danom území vo veľkej miere zmenil pôdny kryt mapovaného územia. Plošne zastúpenejšie areály hnedozemí (67% v roku 1964) boli vystriedané areálmi černozemí (62% v roku 2010). Predpokladáme, že zmeny v pôdotvorných procesoch boli spôsobené zmenou klimatických pomerov t.j. teplejším a suchším počasím v kombinácii so substrátom a reliéfom. Zrážky sú v tomto území charakteristické krátkymi, ale intenzívnymi búrkami hlavne v jarnom a letnom období. Práve to môže byť dôsledkom vzniku regozemí kultizemných, ktoré sa nachádzajú hlavne na strmých svahoch (7-12°). Vznikli ako prejav plošnej vodnej erózie v kombinácii s orbovou eróziou. Hnedozeme sú zastúpená len vo veľmi malej miere 3,58ha (10% v roku 2010) a viažu sa skôr na neogénne sedimenty v konvexnokonkávnych formách. Ílovitejší materiál neogénnych sedimentov a tvar reliéfu tak dáva predpoklad zadržiavania zrážok, ktoré umožňujú zachovať proces ilimerizácie a existenciu hnedozemí.

COMPETITIVENESS OF SLOVAKIA REGIONS IN THE REGIONAL POLICY CONTEXT

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Abstract: *The aim of this paper is to present a differentiated level of regional competitiveness in Slovakia and the effectiveness of EU cohesion policy instruments in regional development.*

Key words: *competitiveness, region, Slovakia*

INTRODUCTION

The experts in many disciplines, including economics, regional development and policy are focusing on the issue of competitiveness. The concept itself is transformed according to professional orientation, time and reference levels of evaluation. The evaluation methods and indicators of competitiveness are often discussed. The aim of this contribution is, in addition to the theoretical background, to highlight the spatial differentiation of selected factors and indicators of competitiveness in Slovak regions.

THE CONCEPT OF COMPETITIVENES

The concept of competitiveness is associated with the micro-economic level, the national (macro) and regional levels. In the 1980's, the term was used especially in relationship to the ability of firms and industries "to produce goods and services successfully in international markets" [1, 6]. In the market-place, there is a competitive "entity capable of serving the market, generate profits, provide real income growth and sustainable living standard" [6, 9] and the "exclusion" of non-competitive firms from the market is emphasized [8, 10] Modification in the understanding of competitiveness is associated with globalization, the transformation process, and the gradual expansion of EU regional policy. National and regional competitiveness are progressing in the context of different assumptions for countries and regions in the growth of competitiveness [4, 8]. National competitiveness is understood ambiguously, and in some approaches it is also questioned due to discussed ways of its transition from micro to macro level ("territories are not competing companies") [10, 15]. Regional competitiveness reflects the ability of regions to provide appropriate conditions for sustainable development, employment growth and quality of life [11]. Competitiveness is considered in relationship to developing preconditions for generating personal income and employment and in assessing the economy, prosperity and living standards of countries and regions.

Competitiveness is influenced by this set of factors; natural, economic, social, environmental and management methodology, interaction specifics including economic, institutional and public, comparative and competitive advantages such as technical and technological, human resources, science and research, innovation and innovative environment, labour market and the political situation. [1, 3, 8] With such terms, national competitiveness is a "broad concept that includes a diverse set of assumptions for success in international markets, with a positive contribution to growth of living standards and quality of life". [1] Regional competitiveness reflects "the ability of the regions to provide a suitable development conditions to economic entities in order to increase competitiveness. Those regions that provide comparable or better development conditions to the operators enter into competitive relationships." [11]. Regional competitiveness is defined as "a result of joint efforts towards the most productive use of internal and external development resources and opportunities to increase sustainable production level of regions" [17]. Today, in addition to demography, economic structure and productivity, the impact of knowledge, the business environment, clusters, innovation and institution governance and ownership is emphasized in the endogenous development of the region. [18].Regional competitiveness is the aim of EU regional policy. In this sense, it is declared to be "the ability to generate relatively high incomes, employment and quality of life in terms of external competitiveness in the sustainability of resources, to sustainable growth of living standards of the region (country) at a low rate of unemployment" [2]. These views are part of the programming documents of regional policy and its member countries in the period 2007 to 2013. The measurement and evaluation of regional competitiveness are quite problematic. Optimization of methods and the selection of appropriate indicators depend on the approach, purpose and evaluation level. [19].

METHODS

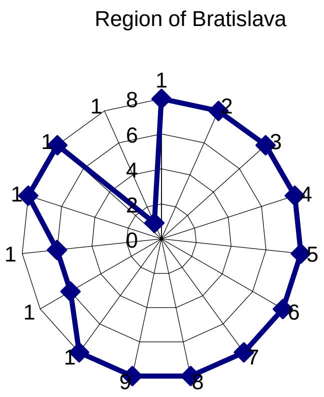
In this article, the competitiveness of Slovakia is expressed by the Global Competitiveness Index (GCI). The factors and indicators selected for the expression of macro-economic environment (indicators 1-7, tab. 1, graph 1), innovativeness (Indicators 8-11) and quality of life (indicators 12-15) are used at a lower hierarchical level. Spatial differentiation of the studied indicators is shown in radial graph 1. This allows identification of the indicators' position and compares the competitiveness of Slovak regions.

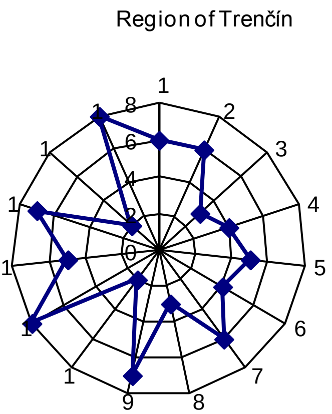
COMPETITIVENESS OF SLOVAKIA AND ITS REGIONS

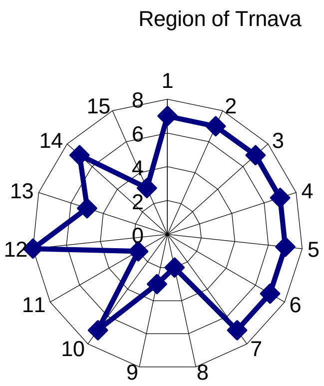
According to the GCI, in 2009 Slovakia was ranked 47th out of 133 countries and it held 3rd place within the V4 countries, behind the Czech Republic and Poland. Despite the decrease in the intensity of GDP growth due to economic crisis, the Slovak Republic was rated as being a developed, innovation "pulled" economy with competitive advantages from the following; The openness of the economy, good legislative conditions for foreign investors, a developed market for goods and services, the high correlation between wages and productivity, a restructured banking sector and the relatively easy availability of financing [5]. Competitiveness of Slovakia regions is spatially differentiated. The Bratislava region, supported by its position in all studied factors, is the most competitive Slovak region. However, the Prešov, Banská Bystrica and Nitra regions are regarded as having the lowest competitiveness, with under-average indicator values for the macro-economic environment. They are perceived as having low production efficiency, weak innovation capacity and below-average quality of life. The Trnava and Žilina regions occupy good positions because of their car industry localization, which currently makes up the body of their economic structure and this is positively reflected in the indicators of the macroeconomic environment. They also have adequate links between regional industry and education, and science and research create the conditions for the formation of an innovative environment and competitiveness growth. In the Trenčín region, the indicators of the macro-economic environment are typically average and they reflect the stagnation of several recently supporting economic endeavours in engineering, textiles and clothing. However, the structure of its economy and the ideal concentration of vocational schools and universities provide the preconditions for the development of innovation, and a good quality of life with low unemployment rates (tab.1, figure 1).

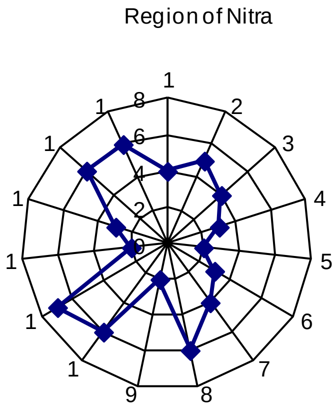
CONCLUSIONS

The obtained results correspond quite closely to the spatial differentiation of complex socio-economic levels and the typology of regions in Slovakia [12]. This indicates a negative feature of Slovakia regional structure and regional disparities, and it also reflects the different preconditions for competitiveness growth. This has also been the basis for "setting" regional development and policy in Slovakia, which is primarily aimed at supporting the lagging regions and balancing regional disparities.









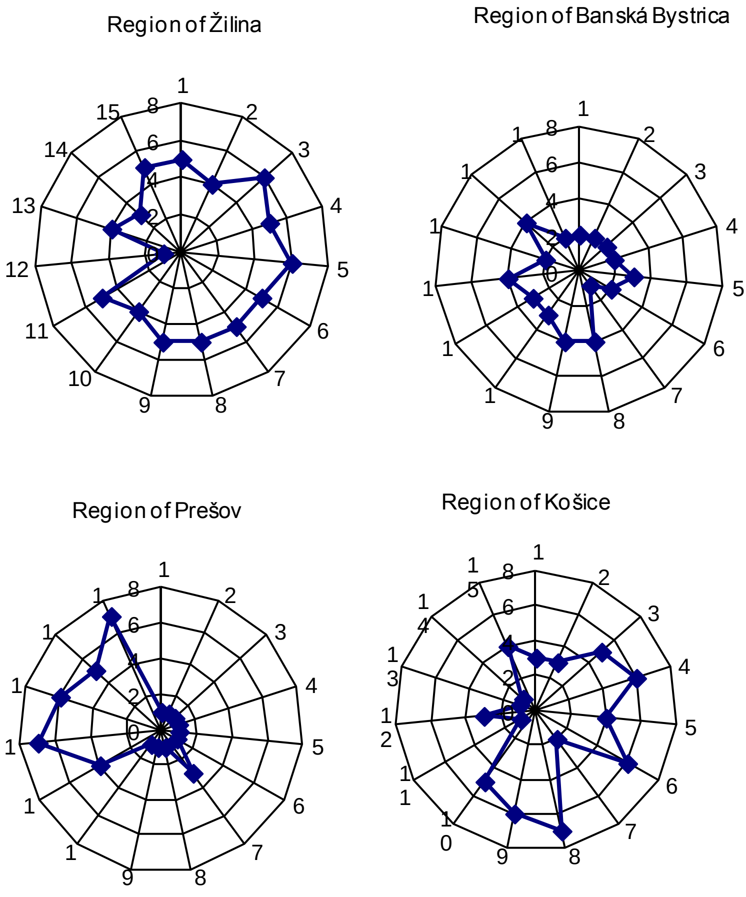


Fig. 1: Regional competitivenes of the SR (31. 12. 2008)
Source: http://portal.statistics.sk/showdoc.do?docid=96

Tab. 1: Regional competitiveness of the SR (31.12.2008)

Region	Indicator of regional competitiveness						
	1	2	3	4	5	6	7
	GDP per capita (EUR)	Value added per 100 inhab. (EUR)	**Labor productivity per 100 inhab. (EUR)**	**Foreign direct investment per 100 inhab. (thousand EUR)**	Gross fixed capital per 100 inhab. **(EUR)**	**Average wage (EUR)**	**The unemploy-ment rate (%)**
Bratislava	27 015	2392,6	48,5	4247,8	737,1	943,5	2,27
Trnava	13 810	1234,9	26,4	776,1	319,6	676,2	4,29
Trenčín	10 560	952,3	11,3	343,4	264,2	630,4	4,95
Nitra	9 548	861,9	12,4	242,5	197,1	606,4	7,41
Žilina	9 552	859,2	17,4	419,9	289,8	646,0	6,2
Banská Bystrica	8 385	757,8	10,6	170,0	222,4	600,0	14,25
Prešov	6 225	558,2	7,7	40,7	168,9	545,7	12,86
Košice	9 333	837,8	14,9	500,6	248,3	671,9	13,5

Region	Indicator of regional competitiveness							
	8	9	10	11	12	13	14	15
	Emp-loyees in research per 1000 inhab.	**Expenditure on R & D per 100 inhab. (EUR)**	**Number of high school students per 100 inhab.**	**Connection to the Internet (% of households)**	**Connection to the sewerage (% of households)**	**Life expectancy**	**Particulate emissions (in t/km^2)**	**Crimes per 100 inhab.**
Bratislava	17,7	25180,5	10,7	66,5	59,4	76,3	0,40	3,94
Trnava	2,2	2341,9	3,7	55,3	86,9	74,8	0,43	1,89
Trenčín	2,6	6909,4	2,1	74,9	53,3	75,6	0,96	1,30
Nitra	3,0	1967,1	3,6	68,9	47,0	74,2	0,48	1,45
Žilina	2,9	2854,2	3,3	61,1	45,7	74,5	0,95	1,61

Region	Indicator of regional competitiveness							
Banská Bystrica	2,6	2811,1	3,1	57,8	52,3	73,9	0,69	2,04
Prešov	1,1	1394,3	1,7	60,6	60,3	74,9	0,50	1,33
Košice	4,1	3739,0	3,3	53,0	51,9	73,7	0,98	1,88

□ - the best position in the SR; □ - worst position in the SR

Source: http://portal.statistics.sk/showdoc.do?docid=96

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Konkurencieschopnosť regiónov SR v kontexte regionálnej politiky

Cieľom príspevku je poukázať na vývoj názorov na pojem konkurencieschopnosť a stanoviť konkurencieschopnosť regiónov (krajov) Slovenska, na základe hodnotenia makroekonomického prostredia, inovačnej schopnosti a kvality života. Konkurencieschopnosť krajov SR je výrazne diferencovaná. Najvyššiu konkurencieschopnosť má Bratislavský kraj, pomerne stabilná je pozícia Žilinského a Trnavského kraja, kde makroekonomické prostredie po lokalizácii zahraničných investícií ako aj koncentrácii vysokých a stredných odborných škôl je predpokladom rastu konkurencieschopnosti. Najnižšiu konkurencieschopnosť majú Prešovský a Nitriansky kraj. Získané výsledky úzko korešpondujú s priestorovou diferenciáciou komplexnej sociálno-ekonomickej úrovne a typológie regiónov SR a z hľadiska regionálnej politiky si vyžadujú zvýšenú pozornosť [12].

AN ANALYSIS OF REGIONAL STRUCTURE IN DEVELOPMENTALLY LAGGING AREAS (ILLUSTRATED WITH THE EXAMPLE OF THE UPPER-HRON REGION)

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Abstract: *Basic attribute of each region is that it consists of elements or parts that are each located in relatively stable relationships and linkages, thus creating certain internal structure. Their external manifestations are material objects regarded as artifacts of human activity which transform a physiognomy of the country.*

The formation of regional structures is fluenced by different processes (mainly economic and political) that determine their differentiation. After the 2^{nd} World War, a significant phase of industrialization of Slovakia begun. Balanced regional policy, regional planning and cooperation of CMEA countries promoted an extensive economic growth. The year 1989 brought changes linked with innovative trends in the West and the loss of Eastern markets, especially in the former Soviet republics.

In terms of regional policy, areas are usually divided according to the degree of socio-economic development as follows: lagging, depressive, developed and advanced. The article focuses only on the first group of regions – lagging ones. Our objective was to *briefly analyse the Upper- Hron region which, since the year 1989, reports a lower degree of development in its economic and social components.*

Key words: *lagging region, natural background, population, economic structure, industry, the Upper-Hron region*

INTRODUCTION

Area is a territory with a continuous economic development in terms of growth, decline or stagnation. The fact that the economic development takes place in the territory means that it is important to take into consideration some specific features which the territory includes [3].

In terms of regional policy, specific conditions of the territory should be taken into account as they are closely related to the regional development and its internal structure. Except for the natural setting and geographical location of the area, there are other crucial factors which have an impact on the regional policy: distribution of the population (reflecting the distribution of settlements) as well as economic activities and communications infrastructure.

In regional policy, areas are often divided according to the degree of their socio-economic development into: lagging, depressive, developed and advanced. The article focuses just on the first regional group - the lagging areas. Our objective was to briefly analyze the regional structure of the Upper-Hron region which, since the year 1989, reports a lower degree of development in its economic and social components.

NATURAL BACKGROUND AND GEOGRAPHIC LOCATION

The Upper-Hron region is geographically relatively easily identifiable. It is situated in the upper part of the Hron river basin in Central Slovakia. Border lines are usually clearly defined by surrounding mountains. Less clear is the determination of the western border which, depending on the selected criteria, can be shifted to the east or vice versa, more to the west. In the article the term Upper-Hron indicates the region of the former Brezno district. We have chosen the correct criteria mainly due to statistic reasons. The territory was determined by the delimitation of the administrative Act approved by the Parliament of the Slovak Republic in 1996. According to the Act, the district of Brezno belongs to Banská Bystrica region.

The relief reflects the geological development and the shape of examined area which was formed mainly in the period of neogene. Tectonic movements led to the dividing the territory into massive mountain ranges and basins. These basic surface forms were created in the erosive quaternary and they were influenced by the river Hron and its side tributaries. Among other things, population distribution and construction of communication lines had a significant impact on the establishment of settlements..

The Upper-Hron region is not a specific natural unit. It is a part of several geomorphic units whose boundaries do not generally overlap with the boundaries of administrative units. The territory consists of two different parts. Basin part with a high-pitched Horehronské valley and highlands of the massive mountain barrier of the Low Tatras, Veporské Hills and the Spiš - Gemer Karst.

The basin part with gentle descent from the east to the west is noticeably elongated. On the eastern side it borders with Besnik saddle (994 m a.s.l.) and on the west side it borders with the inlet of the Hutná river into the river Hron (390 m a.s.l.).

BASIC FEATURES OF THE POPULATION

The principal feature of the area is that its population declines and gradual reduction is reflected in the lower share of the Slovak population. In 1980 the district of Brezno had 67 625 inhabitants (1.4% of the SR population) and in the year 2010 it was 63 702 inhabitants (1.2% of the SR population). Today the population is stagnating and the area is regarded to be a depressed area with natural and migratory population decline. In 2010 the natural increase of the population was minus 2.1 ‰, the net migration -3.2 ‰ and the total increase -5.3 ‰. [8].

In the Upper-Hron region rural population prevails. The development of both populations depends on demographic factors as well as economic and social factors.

Since 1950s, major interregional population movements were replaced by the phase of local concentration of the predominant orientation of migratory flows in the direction of countryside – city. This process is manifested most intensely in the late 1970s and in the first half of 1980s, when the peak phase of extensive urbanization in Slovakia took place [6]. Consequently, both growth and volume of migration among towns especially between towns in close proximity located on different hierarchical levels continued. In this territory we could observe migratory flow directed from Brezno to Banská Bystrica, This was closely related to the economic and natural factors as well.

The development of the age structure of the population in the Upper-Hron region depended on the balance of natural movement of the inhabitants. As the birth rate has been influenced by rational factors rather than biological factors for a long time, economic and social factors have a significant impact on the birth rate in the area.

The impact of mortality on the age structure is obvious, but it cannot be associated only with aging of the population. This is a question of individual approach to every inhabitant to his or her health and healthy lifestyle as well as the question of the level of health care. Migration is as another important factor for the age composition. Especially in 1970s and 1980s there was the strong migration movement from the Upper-Hron region to administrative and economic centers - particularly Banská Bystrica and Brezno were attractive for young and economically active population. They both contributed to the growth of younger age groups and both increased the birth rate, because they moved to municipal centres with their families.

Reducing the birth rate and fertility rate below the level of the so called replacement rate has been reflected in a distortion of the age pyramid, particularly in its base. Productive age group in urban population has been strengthened by a substantial proportion of children who were born at the turn of the 1970s and 1980s. One part of the productive inhabitants, born in the war years was transferred to the retirement component. In larger rural population, movements occurred between the second and the third age groups, because of the low birth rate which is a long-lasting phenomenon here. The share of productive age groups in the district of Brezno in the year 2010 was as follows: infant component – 14.7%, productive component – 62.4%, post-productive component – 22.9%. The average age was 39.5 years at the aging index 155.9 [9].

Specific problem of the area related to the socio-economic structure is unemployment. An increasing number of unemployed people gave rise to a new phenomenon - poverty. In the Upper-Hron region poverty is characteristic for certain social groups (young families with more children, single-parent families, retired people). Other factors causing poverty are long-term unemployment of people in their productive age and homeless people. Ethnic poverty is connected with villages which have a high concentration of Roma population (e.g. Šumiac, Telgárt Vaľkovňa). Roma poverty is mostly caused by high unemployment rate and a high rate of people depending on social benefits.

SPECIFIC FEATURES OF THE ECONOMIC STRUCTURE

From the point of view of a present day socio-economic development, the Upper-Hron region can be classified as under-developed area of Slovakia with a lower regional GDP per capita and with a significantly decreasing share of employment (Table 1). In the economic structure, non-agricultural economic activities dominate, namely industry which since the year 1989 gradually lost its dominant position and is no longer such decisive for the development of the region.

Looking backwards, the process of reshaping the region was conditioned by natural conditions and its geographic location. Humans utilized natural resources selectively in order to satisfy their needs. Close proximity of Banská Bystrica - an important administrative center of the region - had an impact on the economy and migration in the Upper-Hron region. Other factors influencing the economic growth of the region are communication network, transport network and their role in transit traffic [4].

At the end of 2010, the district of Brezno had 1426 business entities (including physical entities) registered in the Commercial Register [7]. The number of corporate enterprises was 812 – almost all of them are owned privately (98.4%). In terms of size structure of enterprises, small business up to 10 employees had dominant position on the market (90.5%). There was only one company (COOP Jednota Brezno) with over 250 employees. Similarly there was only one company with over 500 employees (Brezno hospital) and one company with over 1000 employees (metallurgical company Železiarne Podbrezová).

Tab. 1: Some characteristics of economic prosperity. Backwardness of the selected regions of Banska Bystrica [1)] in terms of their production potential in 2010

District	Enterprises [2)]	NPE [3)]	Turnover [4)]	RU [5)]
Banská Bystrica	37,1	21,8	19,1	9,0
Brezno	***6,5***	***10,6***	***9,7***	***18,0***
Detva	3,1	5,4	3,6	16,2
Poltár	1,2	2,6	0,8	22,1
Revúca	2,2	3,9	4,4	28,8
Rimavská Sobota	6,8	8,9	4,3	*33,6*
Zvolen	14,8	10,9	13,8	9,2
Region	100,0	100,0	100,0	18,9

[1)] neighbouring with the district of Brezno
[2)] share of enterprises (including enterprises with the unknown number of employees)
[3)] the proportion of natural persons-entrepreneurs (NPE) non incorporated

4) the share of turnover in industrial enterprises with 20 or more employees (at current prices)
5) the registered unemployment (RU) rate (the available number of job seekers) Source: [7]

The structure of profitable businesses (total 736) according to the statistical classification of economic activities (NACE EN) includes business activities in sections I and G which account for 36%. Representation of companies in sections B, C, D, E was 14.5 %, in section A is was nearing 13%.
At the end of the period there were 4736 physical entities not registered in the Commercial Register. In proportional representation traders prevailed (93.7%). The proportion of economically active freelance and self-employed farmers was approximately at the same level.
Out of the total area of 1265.21 square km, the district uses only 34 503 hectares of land for agricultural production. With its degree of plowing up to 11.5%, small acreage of arable land and a large range of grassland, the region is similar to most highly situated valley districts of Slovakia. Crop production is mainly targeted on the production of basic cereals and potatoes. Harvested area of permanent grassland was 15 433.7 ha and harvest reached 31 986.5 tons in the year 2010. On the contrary, 94.3% of non-agricultural land is used for the purposes of forestry. Forestry is generally highly productive with the share of, 5% from an overall Slovak production.
Before “the Velvet Revolution” in the year 1989, industry had the most important economic power in the region due to rich history, variability, rich natural resources, namely iron ore as well as other raw materials, rich energy sources and supplies of wood. Its position in the economic structure was significantly enhanced after February 1948 thanks to the special economic programme – pre-war project titled "Plan of economic, social and cultural development of Slovakia”. According to this plan it was socialist industrialization which should have been crucial for further development. The plan included building and construction industry, development of housing policy, development of infrastructure and services, changes in professional and qualification structure of the population, as well as social security. Socialism was a period of decisive economic transformations in the history of the Upper-Hron region. At the same time, the era of socialism was an extremely difficult period in terms of application of optimum patterns in the development of economic activities as well as in applying correct criteria for locating some economic activities in particular urban areas as these should have been in compliance with “socialist” ideology as far as the development of the economy of Slovakia was concerned. Bašovský [2].
Bridge-producing factory Mostáreň Brezno was the most important industrial plant in Brezno which was gradually transformed into a special three-

dimensional unit – the industrial plant [5], with huge production acitivities, providing emloyment for a large number of people and providing housing facilities for its employees. This industrial plant had its branches in Podbrezová Valaská and Hronec. The process of industrialization gradually penetrated into the eastern parts of the Upper-Hron region where industrial plants have been built in Polomka,, Pohorelská Maša and Závadka nad Hronom [1]. Their location was subject to free labour resources.

As far as the structure of industry in the Upper-Hron region is concerned, there were about ten different branches of industry in 1980s, however the key branch was represented by mechanical engineering and iron-processing, each provided more than 6 thousand jobs [4].

After 1989, the industry gradually lost the status of the most important economic activity in the region (in terms of employment). The liquidation of state enterprises was an accompanying phenomenon of the economic development after 1989. At present the statistic data show that in the industrial district of Brezno industrial plants with over 20 employees employed 4,107 workers in the year 2010 (which represent 11.4% in the Banská Bystrica region). Last year´s overall turnover of companies with their own production reached 275.5 million. EUR. From the point of view of the structure of industrial production, the largest volume of sales was achieved in the production and processing of metals. The leading position in the region as well as Slovakia industrial production belongs to the metallurgical company Železiarne Podbrezová. This joint stock company was thoroughly reconstructed and modernized soon after the year 1989. With its 3237 employees, the company now exports its products (precise seamless steel tubes and welded cast iron pipes) all around the world [10].

On the other hand transformation processes had a significantly negative impact on the development of wood industry and machinery industry. Despite the local resource base several wood-industrial plants were forced to close their businesses, such as wood-industrial plant in Polomka, or Sigma Závadka where currently operates several smaller companies. The company SLOVPUMP Trade, Ltd continues in its original production (pumps, water-ring pumps vacuum pumps, compressors, water-ring pumps). Company Bohus, Comp. Ltd. focuses on the production of tube weld arcs. In Pohorelská Maša the Strojsmalt company (production of heaters was closed). One part of the former Strojsmalt´s premises are now leased by WLM, Ltd. which is engaged in pressing metal parts.

In Brezno region we can observe gradual process of functional fragmentation of the existing production, storage and transport premises manifested by a gradual atomization of premises of larger companies. An illustrative example of this process is an industrial engineering company Mostáreň Brezno - former major producer and exporter of Czechoslovak cranes and bridge structures.

After the year 1990, Mostáreň Brezno has undergone several organizational changes that resulted in the privatization, atomization, loss of production and then bankruptcy and liquidation.
Another relatively important source of employment is tourism and services. Small trade operations realize their activities mainly in limited areas as they offer their services to concrete residents of particular villages. Tourism in this extremely attractive territory is mainly based on providing accommodation and catering services in private facilities (hotels, boarding houses). With the number of accommodation facilities in 2010 (92) and the number of beds (2831) Brezno district occupies the second place in the county after the district of Banská Bystrica. The annual number of tourists in the Brezno area (49,765) is higher than for example in the Zvolen district. Last year´s share of domestic and foreign clients was in a 86/14 ratio. Revenues from accommodation were about EUR 2.1 million (9.2% in the region).
The state also contributes to the increase of the level of employment in the area by operating state network of pre-school facilities, schools, health, social and administrative institutions. According to SK NACE, 3 167 persons worked in 2010 in the O, P, Q sections (average number).

CONCLUSION

Regional structure of the Upper-Hron region has reported a lower level of development in individual components of the economic and social level since 1989. The transformation processes have brought disillusionment with reforms, rising unemployment and the decline in real incomes.

Today the population is stagnant and the region is regarded to be a depressed area with low natural increase and migration from depopulation. The most significant problems in the area are unemployment and poverty.

In terms of economic development, the Upper-Hron region can be classified as underdeveloped area of Slovakia with a lower regional GDP per capita and digressive employment. In terms of size structure of enterprises, small business to 10 employees have dominant position here (90.5%). After the year 1989 industry gradually lost the leading as far as economic activities is concerned (from the point of view of working opportunities). In the structure of profitable businesses by SK NACE, prosperous businesses operate mainly in sections G and I.

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Analýza regionálnej štruktúry zaostávajúcich oblastí (na príklade Horehronia)

Regionálna štruktúra Horehronia v jednotlivých zložkách ekonomickej a sociálnej úrovne vykazuje už dlhšie obdobie (od roku 1989) nižší stupeň rozvoja. Transformačný proces priniesol rozčarovanie z reforiem, rastu nezamestnanosti a prepadu reálnych príjmov.

V súčasnosti ide o populačne stagnujúce až depresné územie s nízkym prirodzeným prírastkom a migračným úbytkom obyvateľstva. Osobitným problémom sa stala nezamestnanosť a chudoba.

Horehronie z hľadiska hospodárskeho vývoja možno zaradiť medzi zaostávajúce oblasti Slovenska s nižším regionálnym HDP na obyvateľa a masovým degresívnym charakterom zamestnanosti. Z hľadiska veľkostnej štruktúry podnikov mali dominantné

postavenie malé firmy do 10 zamestnancov (90,5 %). Priemysel po roku 1989 postupne stratil pozíciu najvýznamnejšej ekonomickej aktivity (z pohľadu pracovných príležitostí). V štruktúre ziskových podnikateľských subjektov podľa SK NACE prevládali podnikateľské aktivity v sekciách G a I.

SPATIAL ASPECTS OF SUPPORT INDUSTRIAL DEVELOPMENT THROUGH EUROPEAN UNION FUNDS

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Abstract: *The aim of this article is to analyze the spatial distribution of structural policy instruments of the European Union, aimed at supporting industrial development in the Slovak Republic in the period 2003 - 2009. In the previously published Slovak analysis of research of the spending of EU funds was applied supra-regional level - county (evaluation reports to the Ministry of Economy, National Agency for the Development of Small and Medium Enterprises). This article will focus on the lower territorial unit at the local level - district. In the article is analyzed the number of applications approved for 10 district municipalities and 10 factories in the district, as well as the allocation of 10 district municipalities and 10 district factories.*

Keywords: *industry, Structural Funds, Operational Programme, Slovak Republic*

INTRODUCTION AND METHODOLOGY

A specific feature of the regional structure of Slovakia is spatially distinct and ever-deepening regional disparities, which are an immediate expression of the spatially differential economic and social levels of the regions [1]. The increase of regional disparities is one of the accompanying phenomena of social and economic transformation, realized in Slovakia after 1989, but also processes associated with globalization and the formation of a post-industrial society based on knowledge and innovation. An aid for the elimination and balancing of disparities in regional and subregional levels is the utilizing of EU structural funds. Slovakia has been able to draw resources to support industrial development in three terms – pre-accession period, programming period 2004 – 2006, and the current programming period 2007 – 2013. The aim of this article is to analyze the spatial distribution of structural policy instruments of the European Union, aimed at supporting industrial development in the Slovak Republic in the period 2003 – 2009. We analyse The Industry Development Grant Scheme (IDGS), The Support of Innovative Small and Medium-sized Enterprises Grant Scheme (SISME), The Sectoral Operational Programme Industry and Services (SOP PaS), and The Sectoral Operational Programme Increase of Economic Competitiveness (OP C&EG). In the subsequent processing and evaluation of monitored data, the analysis and synthesis of knowledge was applied. A statistical and cartographic method was used to measure spatial and time changes. The source of information and statistical data bound to the aim of the article were published as summary materials by the Ministry of Economy of the Slovak Republic (MH SR), National Agency for Development of Small and Medium Enterpises (NADSME), Slovak Investment and Trade Development Agency (SARIO), and the Slovak Innovation and Energy Agency (SIEA). Due to the limited availability of statistical data, for industrial plants for the purposes of this article are considered enterprises (legal subjects) with 20 employees and more.

ANALYSES

PRE-ACCESSION PERIOD

The subject of the article, within the support of industrial development through pre-accession EU funds, is the Industry Development Grant Scheme (IDGS), which was implemented under the Financial Memorandum (FM) PHARE 2002. In consideration of the low level of competitiveness of small and medium enterprises (SMEs) in comparison of companies in the EU, as well as the declining share of resources for research and development [2], there was incorporated the new Support grant scheme to innovative SMEs (SISME) within FM PHARE 2003. Public calls for both grant schemes were declared during the period 2003 – 2005.

On 31 March 2006 within the IDGS grant scheme was spent approximately EUR 4 million, which represents 89% of the total amount aimed for the scheme (EUR 4.6 mil.). Funds under Components 1 (C1 - intended for private businesses engaged in manufacturing) and component 2 (C2 - intended for non-profit organizations) aimed mainly at the wood processing industry (share of approved projects of total projects amounted to one-third), metal processing products (16.5%), and furniture and other manufactured goods (11%). According to Project Fiche, in the evaluation process favoured were projects submitted to the following sectors: wood and glass industries, production of building materials, and products from magnetite. Within the IDGS were received 346 applications, 109 projects were approved for C1 and 23 projects for C2. The average amount of funds in C1 reached EUR 37 thousand and in C2 EUR 8 thousand.

Within the SISME grant scheme were 369 applications, approved and also completed were 73 projects worth EUR 4.7 million which represents 92% of the total grant scheme budget. The grant was focused on developing new products in the company, on increasing production efficiency, and reducing unit costs, etc. [2].

From the territorial division of the approved application in the districts of Slovakia it can be seen that 55 districts reported only 1 approved application for 10 county municipalities. The largest number of approved applications were recorded at the districts of Bratislava III and Bratislava I (2 approved applications), since these districts consist of a low number of municipalities. 16 districts of Slovakia were not supported in the pre-accession period.

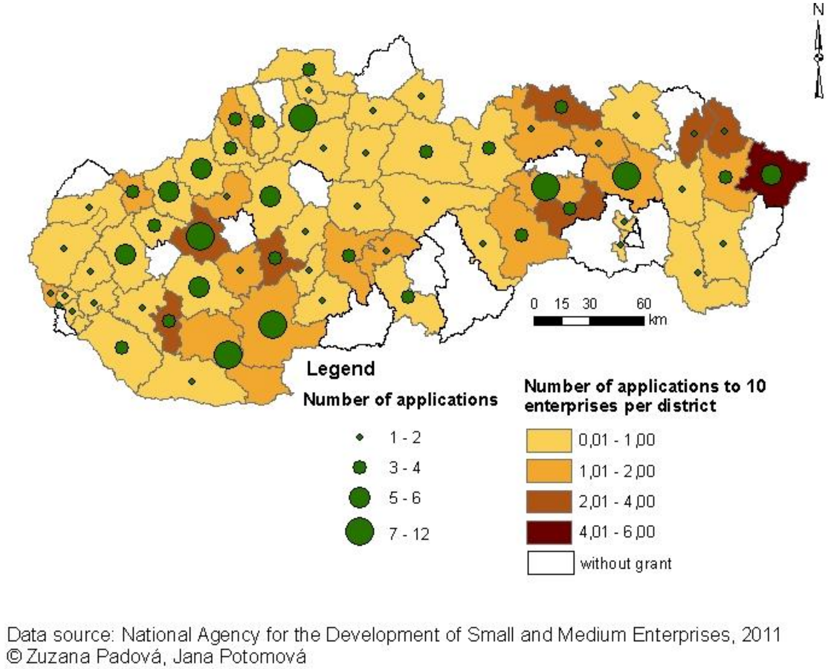

Fig. 1: Spatial distribution of applications in the districts of Slovakia to the number of enterprises in the district (Grant Scheme IDGS, SISME)

As one of the objectives of the grant scheme, IDGS was also the stimulation of the growth of SMEs in key productive sectors, improving the efficiency of their production, improving the selection of products, and processing technologies, we paid close attention to the number of applications approved to 10 industrial plants in the district. The largest number of approved applications was recorded in the Gelnica district, Stropkov and Snina district (3-6 applications). The largest number of districts (54 districts) falls into the category of 0.01 to 2 applications approved to 10 industrial plants in the district.

PROGRAMMING PERIOD 2004–2006

In this period the priority of industrial development was part of SOP PaS. A support for industry under the SOP PaS was elaborated from the horizontal view and not from the aspect of differentiation for individual industry sectors. During this period were declared 14 public calls within the 5 measures that are part of Priority Axis 1. This priority was focused on solving problems in the development of existing enterprises and new businesses, improving their competitiveness, and stimulating the entrance of foreign direct investments [3].

In the examined period within measure 1.1 Support for new and existing enterprises and services were declared two calls for grant, one call under the State Support Scheme and the second call under the De minimis Scheme. Amount 996 of accepted applications indicate that small, medium and large entrepreneurs and organizations established by the state and public administration, who could be eligible recipients of this support, have expressed strong interest in the utilization of funds under those calls. Evaluation commission finally endorsed 139 projects, which have been allocated a grant of EUR 47.13 mil..

In Measure 1.2 Support for building and reconstruction of infrastructure was declared 5 calls in the period 2004–2007 under the State Support Scheme, one of which was in co-operation with NADSME and 4 calls were announced by SARIO. The goal of this measure was aimed at supporting the development of SME, construction incubators, technology parks and research and development centres [4]. Of 67 calls of the grant, approved were 24 projects worth EUR 73.6 mil.

The aim of implementation of the projects corresponding to Measure 1.3 Support of enterprises, innovation and applied research, was the growth of competitiveness through industrial research. Within this measure was declared one call under the State Support Scheme and a call of the De minimis Scheme. SIEA was an administrator and intermediate body of the two schemes. To these calls responded potential requests for 91 projects, of which in the final phase were endorsed 53 projects. These projects were consequently allocated a grant of EUR 7.6 mil.. The main goal of measure 1.4 Support for energy saving and use of renewable energy sources has been implementing projects aimed at energy saving and renewable sources of power [4]. In two calls for proposals were received 64 requests. Among them was a breach of the prescribed formalities which excluded 5 requests. 45 projects were finally approved by the evaluation process. Allocated grant was EUR 25.9 mil.

Supporting the development of international cooperation has been devoted to measure 1.5 Development of foreign cooperation and image of the Slovak Republic. In the analyzed period under this measure raken by the three calls. A call under the State Support Scheme and two calls within the De minimis Scheme. Of the total number of 118 submitted projects, 52 applications were approved in the final phase. SARIO attributed the high percentage of uncertified applications in particular to formal mistakes. Allocated grant to implement the approved applications totalled EUR 2.8 mil..

In spatial aspect, we have to deal with the distribution allocation of district level in the view of 10 municipalities of the district, and then at 10 industrial plants located in particular districts of Slovakia. For the first indicator it can be established that the highest support focused on district Senica, Myjava, Trenčín, Detva, Bratislava III and Košice III I, III, IV in the amount of EUR 2.4 to 4.4 mil. Support for the development of industry in the public and private sector was directed especially in the second indicator (see map 2) to districts Detva, Snina and Gelnica (EUR 3.7 mil. - 5.2 mil.).

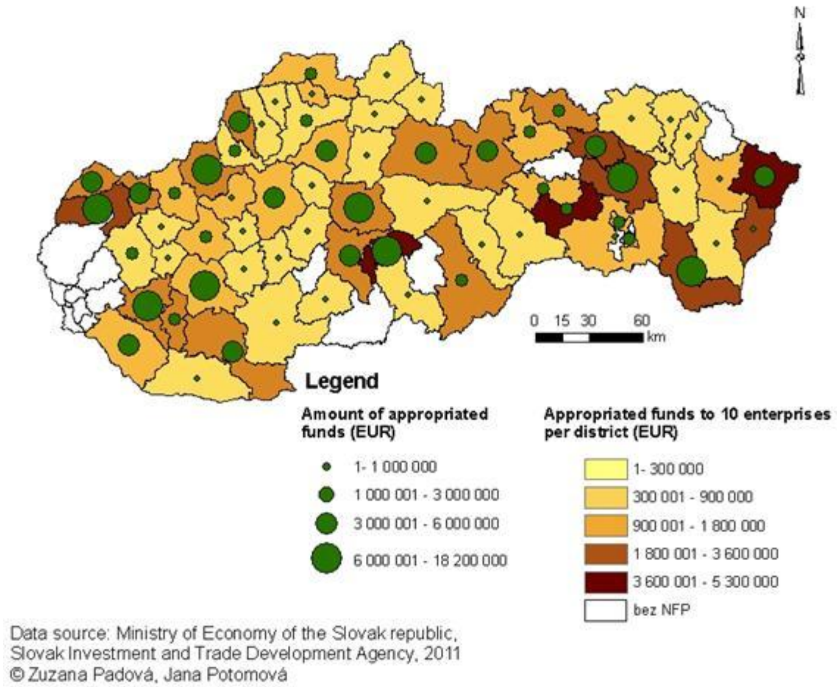

Fig. 2: Spatial distribution of allocated funds in the districts of Slovakia to the number of industrial plants in the district during 2004 - 2006 (SOP PaS)

This fact is affected by the low number of industrial plants in these districts and not a high share of the total allocation. In the analysis of territorial differentiation of contracted projects, it is evident that most funds went in this programming period to Prešov, Žilina, Banská Bystrica, Prievidza, Detva, Martin and others. Many of these districts can be regarded as traditional industrial regions of Slovakia. On the other side, there are some new important industrial regions, such as Nové Mesto nad Váhom, which currently stands at the center of interest of foreign investors.

PROGRAMMING PERIOD 2007–2013

The subject of analysis of this article during the period 2007-2013 is Operational programme Competitiveness and Economic Growth (OP C&EG), particularly priority axis 1 – Innovation and Growth of Competitiveness and priority axis 2 – Energy. The objective of Priority Axis 1 is increasing the competitiveness of industry and services through innovation, focusing on the support of activities that will ensure sustainable development, increased competitiveness, growth of added value, and employment in industry and services sectors. This objective is fulfilled through the implementation of activities within the three measures [5].

The aim of measure 1.1 Innovation and technology transfers is providing support to the private sector by solving the problem of reducing energy consumption and mitigation of environmental impacts. Measure 1.2. is the Support of Common Services for Entrepreneurs. The aim of this measure is to provide support to the public sector in building infrastructure for business development in the industry and services sector. It further aims to support the revitalisation of former industrial and business sites. Support was primarily focused on the revitalisation of Brownfields; development of greenfields was supported only in exceptional cases. The main purpose of measure 1.3 Support of innovation activities in enterprises was to increase the competitiveness of industry through supporting innovation activities and the related applied research in businesses, i.e. through supporting the introduction of new innovation technologies (not their purchase), procedures, or products (for example: introducing quality management systems, product certification, etc.). The purpose of measure 2.1 Increasing energy efficiency both on the side of generation and consumption and introducing advanced technologies in the energy sector was to reduce energy costs, as well as increase the proportion of consumption of renewable energy sources of total energy consumption. [6]. Within these four measures were announced 14 calls for proposal in the period 2007–2009.

There were announced seven calls for proposal within measure 1.1. Contracted were 394 projects worth EUR 197 million, of the total 1 160 applications, which represents 88% of allocated funds for this call. The most demand by applicants was given within the state aid scheme, where maximum grant amount is EUR 6 million. Demand for calls within de minimis aid scheme, where, maximum grant amount is only EUR 200 thousand during three fiscal years, was relatively low. The lowest demand was registered by the call issued within the Scheme to support of international cooperation. To eliminated a financial and economic crisis and associated effects on the industrial sector, committed by the Ministry of Economy of the Slovak Republic adopted measures which increased the maximum grant of de minimis aid scheme from EUR 200 to 500 thousand.

It has supported 11 industrial parks within measure 1.2 (EUR 84 mil. of contracted funds) while, the main priority it has been the revitalization of Brownfield industrial parks as well as capacity utilization of existing industrial parks Tornaľa, Gelnica, Bardejov, Bratislava, Stropkov, Levoča, Krompachy, Levice, and in municipalities Švedlár, Palárikovo and Utekáč [6].

Within measure 1.3 were approved only 18 projects (of 46 applications) with a total value of EUR 14.7 million, which represents only 18% of allocated funds for this call.

According to [7] the reason for this relative lack of interest is the complexity and unattractiveness of the scheme, as well as the lack of time for preparing the project (complexity of the preparation of research and development project is significantly different than the preparation of projects for the acquisition of technology).

It has been declared 4 calls for proposal within the measure 2.1, and finally approved 43 projects of 563 applications amounting to EUR 71 million.

31 districts received grants of between EUR 700 thousand up to 3 million according to the 10 municipalities of the district. The highest amount of allocated funds to the 10 municipalities of the district achieved (except for counties with a low number of municipalities – districts Košice I, II, IV, Detva and Gelnica) districts of Nové Zámky, Banská Bystrica, Zvolen, Žiar nad Hronom, Nitra, where the amount of allocation grants ranged from EUR 3 million to 7 million. We can see (map 3) that in 33 districts the amount of grants ranged from EUR 1.1 million up to 4.6 million to 10 industrial plants in the district. The highest amount of allocated funds was received by the district of Levoča - EUR 19 million and the district of Gelnica EUR 27 million. This fact was due to the low number of enterprises in these districts (only 6 enterprises) and due to the fact that the high amount of grants were directly given especially to brown industrial parks, particularly on the revitalization of the brown industrial zone in the village Švedlár (district Gelnica) EUR 9.9 million and brown industrial zone Levoča - Juh got EUR 7.9 million. Districts of Bardejov, Revúca, Stropkov and Poltár also achieved a high amount of financial support in the range EUR 4.6 million up to 11 million to 10 industrial plants in the district. Also in these districts, the largest amount of grants was given to the construction or revitalization of brown industrial park. (Brown City Industrial Park Bardejov – EUR 9.1 million, Tornaľa Brown Industrial Park - EUR 9.9 million, Stropkov Brown Industrial Park - Phase I - EUR 3.5 million, Revitalization of brown industrial park – Utekáč (district . Poltár) - EUR 5.8 million. Within the OP C&EG there are 3 districts – Hlohovec, Banská Štiavnica and Zlaté Moravce, that did not receive any financial support of EU funds (except for BA Districts Region that are not eligible) in the period 2007–2010.

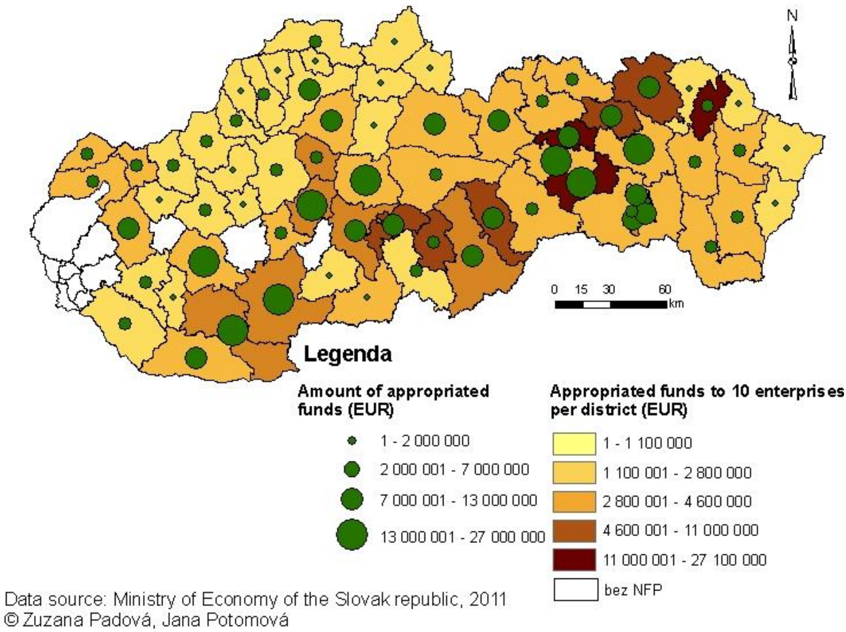

Fig. 3: Spatial distribution of allocated funds in the districts of Slovakia to the number of industrial plants in the district during 2007 - 2010 (OP C&EG)

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The article is part of the solution of Comenius University grants projects no. UK/199/2011 Research of efficiency utilization of the Structural Funds using an econometric model HERMIN, and grant no. UK/506/2011 Research of Brownfield as new opportunities for regional development on the example of Žilina Region.

Priestorové aspekty podpory rozvoja priemyslu z fondov Európskej únie

Otázka účinnosti efektívneho čerpania finančných prostriedkov z fondov EÚ je v súčasnosti vysoko pertraktovanou témou. Po roku 1989 dochádza na Slovensku okrem iného aj k významnej transformácií priemyslu, ktorej cieľom je rast konkurencieschopnosti, inovácií, ale predovšetkým zosúladenie priemyselnej produkcie s ďalšími krajinami EÚ. V sledovanom období 2003 – 2009 boli jedným z nástrojov podpory rastu konkurencieschopnosti existujúcich malých a stredných podnikov a zvyšovania ich inovačného potenciálu za účelom obstátia na medzinárodných trhoch, dotačné programy EÚ. Z uskutočnenej analýzy môžeme vidieť, stúpajúcu tendenciu záujmu o poskytnutie finančnej pomoci zo strany žiadateľov. V mnohých vyhlásených výzvach prevyšoval dopyt žiadateľov po NFP alokované finančné prostriedky vyčlenené na jednotlivé výzvy (napr.: v Schéme štátnej pomoci na podporu zavádzania inovatívnych a vyspelých technológií bol dopyt po NFP viac ako 500%, ako aj pri opatrení 1.2 OP KaHR, kde celkový záujem prevýšil alokované prostriedky výzvy o 35,50% a i.). Avšak aj tu musíme poukázať, na existenciu značných rozdielov medzi dopytom po NFP v rámci schém štátnej pomoci a podľa schém pomoci de minimis. Vysoký dopyt zo strany žiadateľov zaznamenali najmä Schémy štátnej pomoci, kde výška NFP môže dosiahnuť až 6 mil. EUR, zatiaľ, čo pri schémach de minimis (pred navýšením za účelom eliminácie finančnej a hospodárskej krízy) predstavovala max. výška NFP 200 tis. EUR v priebehu troch fiškálnych rokov, po navýšení 500 tis. EUR. Najväčší záujem zo strany žiadateľov zaznamenali výzvy zamerané na hmotné a nehmotné investície smerujúce na nákup technológií, strojov a zariadení a na výstavbu, resp. rekonštrukciu prevádzkových priestorov. Vysokú výšku alokovaných

finančných prostriedkov zaznamenali aj výzvy zamerané na výstavbu a revitalizáciu infraštruktúry brownfield areálov, resp. na výstavbu greenfield. Záujem o tieto výzvy zaznamenal prevyšujúci dopyt nad vyčlenenými finančnými prostriedkami, avšak najmä kvôli formálnym chybám predstavujú zmluvne viazané NFP len 78 % alokácie výzvy. Opačný trend môžeme vidieť pri výzvach orientovaných na realizáciu aktivít zameraných na podporu priemyselného výskumu, experimentálneho vývoja a inovácií. Tieto typy výziev aj napriek vysokým alokovaným finančným čiastkam zaznamenali nízky záujem zo strany žiadateľov ako v prechodom (kedy opatrenie zamerané na túto oblasť malo najnižšiu mieru kontrahovania a čerpania finančných prostriedkov z celého OP PaS., tak aj v súčasnom programovom období, kde záujem o NFP zo strany žiadateľov dosiahol iba 51,28% alokovaných prostriedkov výzvy a ich čerpanie je na úrovni 23 %.

Keďže jedným zo základných indikátorov merateľných ukazovateľov pre monitorovanie a následné hodnotenie stanovených cieľov grantových schém je popri výške tržieb, objemu výroby i vytváranie pracovných príležitostí analyzovali sme vývoj vybraných ukazovateľov v sledovanom období 2003 – 2009. Z priestorového hľadiska bol zaznamenaný najvyšší nárast evidenčného počtu zamestnaných v priemysle v okresoch Galanta, Trnava, Nové Mesto nad Váhom, Topoľčany, Žilina a i. Príčinu možno hľadať, či už v úspešnej realizácii zazmluvnených projektov, ale nemožno zabudnúť i na vplyv priamych zahraničných investícií, ktorých teritoriálne rozmiestnenie sa na úrovni okresoch SR výrazne zlepšilo. Práve priame zahraničné investície majú vo všeobecnosti pozitívny dopad na dopyt po pracovných silách, a teda prispievajú k regionálnemu znižovaniu nezamestnanosti a hospodárskemu vyrovnávaniu daných regiónov [9]. V priemysle pretrváva trend eliminácie prezamestnanosti a zvyšovania produktivity práce. Práve regióny, v ktorých možno pozorovať výrazný nárast produktivity práce v období rokov 2003–2009 sa vyznačujú i vysokým percentom pridelených finančných prostriedkov v rámci jednotlivých dotačných programov. Jedná sa o okresy Galanta, Trnava, Zvolen, Žilina, Nitra, Ružomberok, Hlohovec a i. Tak ako nie je regionálne rozloženie slovenského priemyslu, a jeho základných ukazovateľov rovnomerne rozmiestnené, tak možno z priestorového hľadiska pozorovať i výraznú diferenciáciu v lokalizácii výšky pridelených finančných prostriedkov viažucich sa na zazmluvnené žiadosti.

BREWING IN SLOVAKIA

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Abstract: *Brewing has a long tradition in Slovakia although it is not comparable to Czech brewing from several aspects. The Slovak brewing has undergone several stages of its early historical and post-socialist development and qualitative-quantitative status. Perhaps the most striking change in the brewing industry occurred due to privatization of the brewing industry after 1989. While there were many breweries in operation in the early 90's of the last century there, soon many of them have been closed. The presented paper aims to present a comprehensive geographical temporal-spatial structure of this food industry sub-sector.*

Key words: *brewing, transformation, foreign investments, small breweries*

HISTORY OF SLOVAK BREWING

The period before capitalism. Beer production in Slovakia has been known since the early Middle Ages. Some experts believe that the word "beer" has Slavic origin. Proof of brewing and related activities (hop agriculture, malt production, beer draughting) can be identified is a number of geographic names that are still preserved in Slovakia: villages – Chmeľov, Chmeľnica, Chmeľová; miestne časti obcí – Chmeľník (Bertotovce), Pivovar (Martin, Bojná, Horné Lefantovce, Stupava, Šaštín, Továrniky), Chmeľnica (Bojničky), etc. The evidence of brewing can be traced in names referring to a particular job in brewing: Pivarčák, Pivarník, Pivovarník, Piovarči, Chmelár, Chmeliar, Chmeľovský, Chmelík, Sladkovský, Sládek, Sládkovič – Braxator(is), etc.

In written form, brewing is found in documents since the 5th century AD, in the region of the Tisa River and on the estates of the monastery in Hronský Beňadik. First documents reporting beer production are known from the 13th century. The documents say: *„ ...the subordinates from Šaľa brewed and supplied beer for the monastery in Svätý Martin ...“*. Brewing was an integral part of legal city rights in the feudalism. Beer was brewed within the framework of the city economy (city breweries in Bratislave, Modre, Pezinku, Trenčíne, Zvolene, Krupine, Brezne), or the legacy brewing was assigned to particular noble men, while strict order of brewing was controlled (Banská Bystrica, Prešov, Bardejov, Sabinov, Zipser towns – the oldest still operating brewery in Slovakia in Švedlár). The residents of subordinate towns brewed beer based on agreement with their landlord (Beluša, Považská Bystrica, Bytča, Gelnica and others). In both types of the cities/towns malting had been established as a special branch within brewing. Both crafts were coordinated in craft associations since the 16th century. The first craft associations for brewing were founded in Bardejov (1587, resp. 1450) and Kežmarok (1589). During the feudalism period, 17 craft associations for malting were established, the oldest in 1506 in Prešov. By the 1828, there were 30 malting crafts in Slovakia and malting on its own has been ceased by the development of brewing industry.

Brewing finds the most favourable conditions in the cities, because of the concentrated demand for the supply. Beer used to be less popular in the countryside. Development of the brewing industry started in 16th century when landlord brewing occurred, which posed limits on brewing by subordinates. The latter rarely managed to survive until the 19th century (Bartošova Lehôtka, Jastrabá, Prochoť, Ždaňa, Lovča, Hliník nad Hronom, Horné Hámre.) Brewing and malting processed only local materials such as barley (also wheat) and hop, which was a specific issue.

The oldest brewery still producing beer is in Vyhne (since 1473). Later several breweries along the Váh river were founded (Trenčín, Beckov, Ilava - 1635, Bytča, Nové Mesto n/V.), but also in Trnava, Banská Bystrica, Levoča, Bratislava – 1635 (map 1). There were about 300 breweries in Great Hungary in the 1840s at the edge of capitalism. Most of them were situated in the territory of modern Slovakia.

The period of capitalism. The first phase of capitalism begins after the wave of revolutions in 1848 and after the Austro – Hungarian Equalization. Since that time, a new social order has been formed and it is characterized by a concentration of capital and research and technology development especially in transportation.

This period is specific for beginning of industrial malting in Slovakia. Malting enterprises were established in western Slovakia, where high-quality malting barley was grown in large scale. The first maltery was built in Trnava – Sessler (1855) which is the „cradle of the Slovak malting “, thereafter: Nové Mesto n/V. (1870), Moravský Ján (1870). Malting as individual industry originated due to over-production of barley in Slovakia that time. Barley suited the best as the raw material for high quality malt production. In Czechoslovakia, at that time, there were 137 malting companies operating, of which Slovakia had is only 22, mostly in the Bratislava County and in the Nitra County. In 1933-34 there were 14 small, 6 medium and 2 large malteries. Larger amounts of barley which could not be processed in Slovakia were exported to Bohemia. Malt export was maintained till 1942. The export was oriented mainly for Western Europe (Belgium, Netherlands, Luxembourg and Switzerland).

The breweries had not very favourable conditions for development due to beer tax introduced in 1855. In that time since 18^{th} century, the best quality beer was produced in Kežmarok and Trenčín. The beer was transported up to southern Hungary by wooden rafts via rivers. There were 9 breweries in 1900 in Slovakia, which employed 314 workers. The number of workers increased to 384 in the following ten years. In that time, breweries in the cities and towns as follows were established: Bratislava (1876), Nitra (1893), Košice (1857), Spišská Belá (1877), Martin (1893) and re-established in Vyhne (1894) – map 1. There were 18 breweries in operation before 1914 in Slovakia and their production made 7,66 % of total production of beer in Hungary.

The industry in Slovakia appeared in a new economic-geographic position between the World Wars. While Slovakia used to be the most industrial part of Hungary and the central producer of beer and also the place of demand, establishment of Czechoslovakia initiated competition for the market. The effect in brewing and malting was even stronger as Czech countries were unbeatable basis. There were only 21 Slovak breweries out of 491 operating in Czechoslovakia. The Slovak breweries produced 350 000 hectolitres of beer in the 1920/21 campaign which is 5 % of the state production (Bujnák, P., 1932, s. 235). Since 1923/24, Czech beer had penetrated the Slovak market and presents a strong competition to the local breweries. The work in the third biggest brewery in Nitra was ceased (13.4 thousands hectolitres). The other two remain active, Bratislava (35.4 thousands hectolitres) and Poprad (15 thousands hectolitres). Beside these, only 9 breweries were still active after the World War I: Vyhne (13 100 hectolitres) Veľká Bytča (7 500 hectolitres), Ilava (7 1000 hectolitres), Banská Bystrica (7 000 hectolitres), Martin (6 600 hectolitres), Podbiel (2 670 hectolitres), Spišská Belá (2 480 and 2 140 hectolitres), Levoča (2 000 hectolitres) a Kežmarok (1 560 hectolitres).

Although the production in brewing was still rising in Czechoslovakia it has not reached the level before the World War I. There was 440 breweries in 1931 in Czechoslovakia, which produced 10 381 460 hectolitres of beer (23 600 hectolitres per brewery on average). There were 16 breweries in Slovakia and Sub-Carpathian Russ producing 327 724 hectolitres. Czechoslovakia was the third biggest beer exporter in the world that time. Further, there were 489 malteries in operation in Czechoslovakia that time. According to Bujnák (1932, p. 235), 15 breweries operated in Slovakia in 1931 and they produced together 303 335 hectolitres of beer, while their capacity was underexploited (50 %).

In the 1940s, the most productive brewery was in Bratislava. Its production made 28% of the whole Slovak production. The second one was in Veľká Bytča, but it was producing less than a half of amount of the first one. Other breweries producing more than 80 000 hectolitres of beer operated in Martin and Michalovce. The brewery in Vyhne produced over 60 000 hectolitres.

The period of socialism. This era comes after 1945, or more specifically after 1948, when the industry was nationalized. Premises remaining in private possession had to be closed. Established national businesses and retail unions, solely in food industry, took over 22 000 production units. The process of concentration of food industry production continued. In 1955, the number of technical units reached 1/5 of the state in 1948 and decreased down to 4755 units in 1965. This phase of industry nationalization prioritized establishment of at that time non-existing industrial branches, strengthening the capacity of existing branches, and equalisation of spatial distribution of the branches with respect to the place of demand. Nationalization of 12 breweries of the 960 000 hectolitres capacity presents a historical benchmark. Regarding the malteries, 11 of them were nationalized with the capacity of 27 000 tons. Table 1 lists the breweries built within the new construction scheme.

Tab. 1: Construction of breweries and malteries in Slovakia during the industrialization period.

Year	Brewery	Capacity (hectolitres)	Year	Maltery	Capacity (tons)
1953	Nitra	370000	1954	Nitra	11103
1964	Topolčany	500 000	1964	Topolčany	16000
1966	Rimavská Sobota	350 000	1964	Michalovce	33000
1967	Veľký Šariš	1 200 000	1965-66	Rimavská Sobota	16000
1969	Hurbanovo	1 200 000	1967	Hurbanovo	66000
1971	Banská Bystrica	350 000	1974-75	Levice	33000
1974	Trnava	350 000	ca. 1980	Veľký Šariš	16000

Source: Pramuk, M., 1998 (manuscript).

The very exact process of concentrating the production is confirmed by the fact, that, while a single brewery produced 97 000 hectolitres of beer on average in 1948, it was as much as 328 000 hectolitres in 1969.

Since 1960, there were quite extensive reconstruction and modernization of breweries made in Hlohovec, Levoča, Bratislava - burgess brewery, Banská Bystrica. The total capacity of the reconstructed breweries was 250 000 hectolitres. Construction of new breweries and reconstruction of older achieved a capacity of 6.3 million hectolitres of beer while the the production was 6.1 million hectolitres. Consumption per capita in this period reached 125 litres per person per year.

Malting produced a total of 18 thousand tons of malt in 1948. This production was already exceeded in 1970s by the modern maltery Hurbanovo (31 000 tons of malt) and by the newly built (1974-1975) maltery in Levice having a capacity of 35 000 tons of malt. Thus the total capacity of the Slovakak malteries reached 250 000 tons of malt per year. The breweries and malteries built in that time fulfilled high quality demands applicable globally and they met high requirements for production and export.

Up the year 1989, the Slovak breweries and malteries were organized within four main national enterprises: Západoslovenské pivovary, n.p. Bratislava (Bratislava, Nitra, Hlohovec, Hurbanovo), Stredoslovenské pivovary a sodovkárne, n.p., Martin (Bytča, Ilava, Martin, Vyhne, Rimavská Sobota a Banská Bystrica), Východoslovenské pivovary a sodovkárne, n.p. Košice (Košice, Michalovce, Poprad a Veľký Šariš) a Slovenské sladovne, n.p. Trnava (Sladovňa Trnava a Michalovce a pivovar a sladovňa Topoľčany).

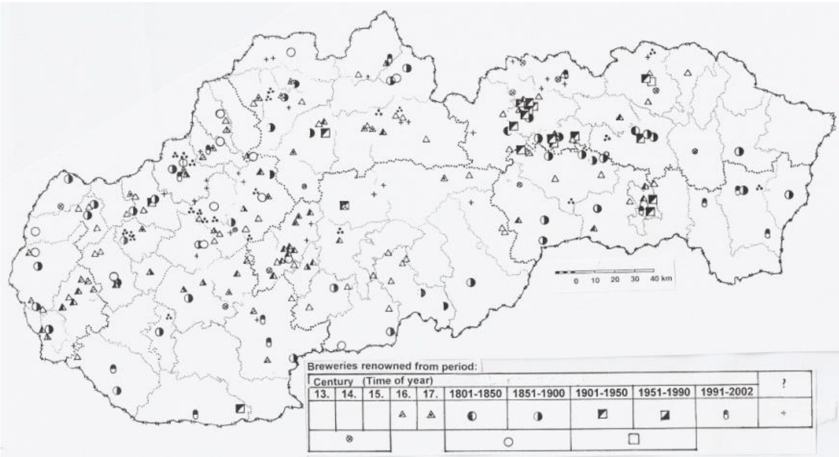

Fig. 1: Spatial distribution of breweries in Slovakia

CURRENT STATE OF THE BREWERIES IN SLOVAKIA

Transformation processes, which initiated after 1989, affected also the discussed branch of the food industry. All breweries underwent the process of privatization which was in many instances unsuccessful and resulted in downfall of breweries. The foreign investors, such as the Dutch Heineken (entered the brewery in Hurbanovo in 1995) and the Southafrican SAB Miller (enetered the brewery in Veľký Šariš in 1997), played a crucial role. The companies gradually privatized or acceded in other brewing enterprises:

Heineken – Nitra (1997), Martin a Rimavská Sobota (1999), SABMiler – Topoľčany (2007).

There were 17 breweries in operation at the beginning of 1990s. Later in 1998, 13 were still active: Stein Bratislava, Horden Trnava, Konbier Ilava, Popper Bytča, Martiner Martin, Tatran Poprad, Starý Prameň Michalovce, Gemer Rimavská Sobota, Steiger Vyhne, Urpín Banská Bystrica, Topvar Topoľčany, Šariš Veľký Šariš, Corgoň Nitra. However, this number begun to fall due to various reason: competition, beer tax, increasing effectiveness of production. The brewery in Michalovce, stopped in 1999, as import tax was increased in Ukraine which was the main importer of the beer production (70% of the 100 000 hectolitres of beer). The brewery in Ilava switched its beer production to lemonade in 2000. The Breweries in Trnava and Martin ceased production in 2003. While in the first case the main reason was in termination of the brand mark Horden, increasing the effectiveness was the main reason in the latter case. Heineken moved the production of the Martiner beer from Martin to Hurbanovo. The same happened in Nitra (2005) and Rimavská Sobota (2006). Closing of breweries is related to concentration and globalization of the beer production, which becomes economically more effective. Heineken produces as much beer as it used to in its former four breweries altogether. The production of the Stein brand mark in Bratislava was ceased in 2007 and it was moved to Vyhne. The initiating factor was in an increasing pressure on the business with properties occupied by the brewery. Similar sitiation occurred in 2010 when SABMiller moved its beer production from Topoľčany to Veľký Šariš. The previous premises are used as the company's administration centre and retail-distributional centre. Further, the Pilsberg beer from Poprad is being produced in Poland.

Beer is now produced in five Slovak towns – Hurbanovo, Veľký Šariš, Banská Bystrica, Vyhne a Bytča. Heineken, based in Hurbanovo, is the leader of the beer production in Slovakia (about 45 % of the domestic share) producing almost 2 million of hectolitres annually. At the moment, the company employs 721 people. Besides the investments in the brewery, Heineken built up the greatest maltery in Central and Eastern Europe which produces about 145 000 tons of malt per year. The Southafrican SABMiller is based in Veľký Šariš and shares about 40% of the Slovak beer trade employing about 600 workers. The remaining three breweries are smaller producing roughly 200 000 hectolitres per year while their domestic market share together is only 5 %. The rest belongs to imported beers (ca. 10 %). The Steiger Brewery is owned by an English financial company - the Endemit. The brewery in Bytča and in Banská Bystrica are owned by a Slovak company - KK Company – Pivovary s.r.o. The capacity is 210 000 hectolitres of beer.

Spatial distribution of draught beers produced in Slovakia is generally dependent on the area where beer is produced. Consumers are often proud "of their brewery," and thus prefer beer from the area in which they live. The Šariš beer is from its origins linked to the region Šariš. In addition to the Prešov district, the beer has found its supporters throughout eastern Slovakia. The Topvar brand was formerly a regional beer, but it has gradually spread across Slovakia. Beer drinking is particularly popular in western Slovakia. While Corgoň used to be a regional brand, it is nowadays distributed in pubs throughout Slovakia similarly to well-known Golden Pheasant. Beers of the two brands together with Šariš belong to the most popular brands which can be found in pubs all over the country. The brands of Gemer and Martiner are typically regional brands. The Brewery in Vyhne is relatively a smaller enterprise but its brand Steiger is draught across Slovakia. Stein produced also in Vyhne is still a local brand of the Bratislava region. The beer Urpiner can be certainly regarded as a regional brand, although it has its huge market outside the region where it is produced which is mainly the north of Slovakia (the Kysuce region). The production of the Popper brewery in Bytča is consumed particularly in the districts of Bytča, Púchov and Považská Bystrica.

Small local breweries. There is around 10 small local breweries in Slovakia. Their annual capacity is at the level of few thousands of hectolitres per year and their strategy is based on the patriotism of the local people. In comparison, there are tens of such breweries in the Czech Republic and new ones are being established. Preservation of traditional taste of beer is one of very popular marketing aspects of the small breweries as large supra-regional companies tend to change the recipes. For example, after SABMiller acceded in Topvar in Topoľčany, a small brewery was built in Nemčice. After Heineken closed the brewery in Martine a small brewery KEG Servis Slovakia launched beer brewing in Bodorová. The first small brewery originated in Banská Bystrica and is called Perla. Its brand is called Zlatá Perla. There is only one small brewery in the biggest Slovak city of Bratislava (Richter Jakub) while there are about ten of them in Prague. Its production is about 200 hectolitres per year. A local entrepreneur linked his plans with the beer tradition in Trnava and bought the oldest Slovak maltery while founding the brand of Sessler according to the first owner. There is a small brewery Kaltenecker in Rožňava. Local beer is also produced in the restaurant Golem in Košice. The smallest village where a brewery exists and operates is in Kvačany, in the region of Orava. In 2010, there was a restaurant type brewery established in Banská Štiavnica which is called ERB.

CONCLUSION

Slovak brewing industry has undergone difficult time in the last few years. The production of beer is decreasing and many Slovak enterprises have been closed. There are only five breweries still existing from the original fifteen privatized breweries. Since the best year of 2002, the domestic beer production fell down from 4.8 million hectolitres to 3.3 million hectolitres in 2009. The problem of the Slovak breweries is in taxes which make domestic beer dearer as opposed to the Czech beer. The Slovaks also started to prefer other drinks which is another factor of problems. The breweries need to accommodate the new market behaviour in order to stop the downfall of production. For example, they launched production of flavoured beers or selling beer in plastic bottles which would have been inacceptable by consumers few years ago.

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Pivovarníctvo na Slovensku

Pivo na území dnešného Slovenska varili už starí Slovania. Najstarším pivovarom na Slovensku, ktorý varí pivo doposiaľ, je pivovar vo Vyhniach (od r. 1473). Pivovarnictvo na Slovensku prekonalo viacero fáz skoršieho historického aj postsocialistického vývinu a kvalitatívno – kvantitatívneho statusu. K etapám, ktoré výrazne ovplyvnili vývoj pivovarníctva patrilo aj obdobie po vzniku ČSR, kedy dostalo slovenské pivovarníctvo silnú konkurenciu z českých krajín. Nasledovalo socialistické obdobie s výstavbou viacerých pivovarov a s množstvom organizačných zmien – vznik 4 štátnych podnikov. Naň nadviazali transformačné procesy, ktoré prebehli v priemysle Slovenska po roku 1989 a neobišli ani sledované odvetvie potravinárskeho priemyslu. Jednotlivé pivovary museli prejsť procesom privatizácie, ktorá bola v mnohých prípadoch neúspešná a viedla k zániku pivovarov. Výraznou mierou do odvetvia zasiahli zahraniční investori – holandský Heineken (príchod v roku 1995 do Hurbanova) a juhoafrický SABMiller (v roku 1997 do Veľkého Šariša). Tieto sa spolu podieľajú na slovenskom trhu 85%. Podieľali sa však na redukcii počtu pivovarov – postupne zatvorili pivovary v Martine, Rimavskej Sobote, Nitre (Heineken) a Topoľčanoch (SABMiller). Aj vzhľadom na to možno skonštatovať, že slovenské pivovarníctvo v posledných rokoch nezažíva ľahké obdobie. Ešte na rozhraní tisícročí patrilo k nosným odvetviam domáceho potravinárskeho priemyslu, avšak počnúc rokom 2002 jeho produkcia vykazuje prudkú regresiu, ktorá sa prejavuje významným poklesom výroby a spotreby piva. Od najvydarenejšieho roku 2002 domáca výroba piva do roku 2009 klesla z vyše 4,8 milióna hl. na 3,3 milióna hl. Problém slovenských pivovarov je vysoká spotrebná daň, ďalšou príčinou však je aj to, že Slováci uprednostňujú iné nápoje. Z bývalej pätnástky sprivatizovaných pivovarov zostala iba pätica. Do istej miery možno prirovnať tento proces k vývoju cukrovarníctva na Slovensku, kde taktiež došlo k značnej redukcii počtu cukrovarov.

THE DEVELOPMENT OF AGRICULTURE IN SLOVAKIA FROM JOINING THE EUROPEAN UNION TO THE PRESENT

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Abstract: *The paper deals with the development of agriculture in Slovakia from joining the EU to the present. We deal with the following areas of agriculture - structure and use of agricultural land, structure of the workforce, structure of agricultural subjects and selected indicators of crop and animal production on the level of the Slovak Republic.*

Key words: *Slovakia, agricultural land, workforce, agricultural subjects, selected indicators of crop and animal production*

INTRODUCTION

Slovakia, by entering the European Union, has made an important step in its historical development. Integration into the European Union has affected all areas of economic and social life of citizens and also the agriculture itself. Agriculture is one of the most sensitive sectors of the economy, not only in Slovakia, but in the whole European Union. As the economy sector it has specific characteristics and regardless its size or proportion in the national economy, it is a strategic area of the economy in any country. Agricultural policy is a key element of the economic policy in each country.

MATERIAL AND METHODS OF THE PAPER

Transformation of the Slovak agriculture after 1989 as well as consequences of joining the EU in 2004 and also specifications of individual regions and their disparities were the issues of several geographers e.g. Spišiak et al. [8], Spišiak, Némethová [7], Dubcová et al. [2], Némethová [4, 5, 6]. In the Czech Republic, these issues are elaborated by e.g. Bičík, Jančák [1], Kabrda, Jančák [3], Svobodová [15, 16], Věžník [18], Věžník, Štěpánková [19]. The important information of statistical nature, by which we presented the development of agriculture in Slovakia from joining the EU to the present, were obtained from the Report on Agriculture and Food Sector in the Slovak Republic in 2005–2010 [9-14] and from the Statistical Yearbook of Soil Fund in the Slovak Republic [17]. In the paper, we firstly focus on the development of agricultural land area and its use, development of the structure of workforce in agriculture, development of the structure of agricultural subjects and developmental tendencies of selected indicators of agricultural production in 2004 and 2009. In the whole paper we used mainly the method of analysis and the method of comparison of obtained data in the monitored years.

DEVELOPMENT OF STRUCTURE AND USE OF AGRICULTURAL LAND

Soil is the most important means of production in agriculture. Its quality and quantity greatly influences the development of this sector of economy. The use of land depends primarily on natural conditions and those are very varied in Slovakia. Total area of agricultural land in Slovakia was in the year 2004 2434749 ha which is 49.7 % of the total land area of Slovakia. In the year 2009, agricultural land had only 2417933 ha which is, compared to the year 2004, a decrease of 16816 ha (-0.7 %). Its proportion of the total land area decreased to 49.3 % which is of 0.4 percentage point (p. p.) less. The largest area of agricultural land is arable land which had in 2004 the size of 1430594 ha and its share in that year was 58.8 %. By the year 2009, the acreage of arable soil decreased to 1417983 ha which is 12610 ha less (-0.9 %). This means that the degree of percentage of arability in a given year had the value of 58.6 %. In terms of internal structure of agricultural land, permanent grasslands have the second largest area. Permanent grasslands had in the year 2004 the area of 881054 ha (36.2 % of agricultural land). In the year 2009, the area was about 2813 ha less (-0.3 %) which represents 878470 ha. In the year 2009, there was a slight increase in their proportion to 36.3 %. The smallest area had permanent crops which in 2004 had the size of 123101 ha (5.1 % of agricultural land). During the monitored period, there was again a decrease in the area of permanent crops by 1621 ha (-1.3 %) to 121480 ha and also the reduction of its share to 5.0 %. The trend of decline in agricultural land and its forms will probably continue in the SR, as evidenced by the overall development of society.

DEVELOPMENT OF WORKFORCE IN AGRICULTURE

In 2004, agriculture employed 86600 employees, 63100 (72.9 %) men and 23500 (27.1 %) women. By 2009, there was a big decrease of employees, up to 24.6 % which means that in 2009 there were only 65300 of them. The number of men dropped to 46428 (71.1 %) and women to 18872 (28.9 %). This decrease in employees persists even today.

In the structure of workforce in terms of education in 2004, the proportion of trained employees dominated, accounting for 53.9 %. By 2009 their proportion has increased to 57.3 which was an increase of 3.4 p. p. The second largest group in 2004 was the employees with complete secondary education with A-levels whose proportion was 25.5 % of the total number of employees. In 2009, however, their proportion was only 19.4 % which means it decreased by 6.1 p. p. The relatively high proportion of 13.9 % in 2004 represented the employees with primary education. The situation in agriculture does not improve the fact that their proportion is growing because in 2009, it reached 14.7 % which is an increase of 0.8 p. p. Employees with university education in 2004 represented only 6.9 %. During the monitored period it was a positive, although still insufficient, increase by 0.6 p. p. which is 7.5 %.

Decrease in the number of employees in agriculture is reflected in the negative changes in the age structure of employees. During the monitored period, there was a gradual growth of proportion of employees in older age categories while the proportion of younger employees has steadily decreased. While in 2004 the proportion of employees aged 55-59 years old was 9.7 %, in 2009 they represented 16.7 %. The proportion of employees aged 50-54 years old in comparison with the year 2004 increased by 3.9 p. p. and thus in 2009, these employees represent 22.5 % of the total number of employees. Increasing trend can be also seen in the case of the oldest age category of 60-64 year old employees whose proportion increased from 1.4 % in 2004 to 4.0 % in 2009 which is the increase of 2.6 p. p. On the contrary, the proportion of younger age groups is declining steadily. In 2004, the proportion of employees in the age group of 30-34 year old was 8.5 % and in 2009 it was only 5.4 %. Also in the category of employees aged 20-24 years old, the proportion of employees also decreased from 3.9 % to 2.3 %. The largest decrease was recorded for the age group of 40-44 year old where the proportion decreased by 4.2 p. p. from 16.5 % in 2004 to 12.3 % in 2009. The same decrease was recorded also in the category of employees aged 45-49 years old whose proportion in agriculture in 2004 was 21.7 % and in 2009 only 17.5 % with a decrease by 4.2 p. p.

DEVELOPMENT OF STRUCTURE OF AGRICULTURAL SUBJECTS

In 2004 there were totally 8586 agricultural subjects in Slovakia. By 2009 their number increased to 9069 which is an increase of 5.6 %. Of the total number of agricultural subjects in 2004, there were 6 state-owned firms (0.1 %). During the monitored period, there were only minimal changes of their numbers and thus the same situation was in 2009 and in 2004. Agricultural cooperatives with a total number of 668 had in 2004, within the business structure, the proportion of 7.8 %. By 2009, their number decreased to 597 (6.6 %) which is by 10.6 %. In terms of the area of agricultural land, the agricultural cooperatives retain a dominant position in agriculture, but their proportion on the total area is declining each year. The number of commercial companies increases very dynamically. In 2004 they represented totally 1171 with the proportion of 13.6 %. Their number in 2009 has increased to 1325 (14.6 %), this means that there was an increase of 13.2 %. Regarding commercial companies, the largest group represents the Ltd. companies which numbered totally 1044 in 2004 which was 12.2 % of total agricultural subjects. By 2009, their total number has increased to 1195 (by 14.5 %) and thus its proportion was 13.2 %.

DEVELOPMENT OF SELECTED INDICATORS OF CROP PRODUCTION

Crop production is highly dependent on the market economy. It is shown by significant changes in sown areas which occur in Slovakia especially after joining the EU. In the structure of sowing crops in 2004 dominated the cereals which represented 61.0 %. By the end of the monitored period (in 2009), their proportion decreased slightly to 56.8 % which is by 4.2 p. p., but nevertheless they remain dominant in the structure of crop sowing. Oil plants are very important crops in Slovakia being demanded in the market which is reflected in the relatively large proportion in the structure of sowing. In 2004 they had the proportion of 13.7 %, but by 2009 their proportion increased up to 18.6 % (+4.9 p. p.). Because of closing sugar factories and problems with the sugar sale, the sowing areas of sugar beet decreases. In 2004 the sowing areas of sugar beet had 2.6 %, but in 2009 they had only 1.2 % which is decrease by 1.4 p. p. Problems with the competition after accession to the EU has also the vegetable growers who have rapidly decreased sowing areas. While in 2004 the sowing areas of vegetables represented 0.9 %, in 2009 it was only 0.6 % which is decrease by 0.3 p. p.

Production of agricultural crops is influenced mainly by the size of sown areas of crops. Cereals had the highest overall production during the monitored period. In 2004 their production was 3793.1 thousand tons. By 2009 their production slightly decreased by 12.2 %, but with a total production of 3300.0 thousand tons they represent dominant crop. The decline in production was recorded for sugar beet (-43.8 %), potatoes (-43.4 %), grape (-25.2 %) and fruit (-2.5 %). On the contrary, oil plants production increased by 20.0 %.

DEVELOPMENT OF SELECTED INDICATORS OF ANIMAL PRODUCTION

Animal production consumes a large part of crop production which means that it is more energy consuming. Livestock production and crop production create two equal components of gross agricultural production. Therefore, the best condition is when both productions are in balance. Since 2007, in Slovakia plant production started to dominate over livestock production. Before the transformation of agriculture, the animal production was characterized by higher numbers of livestock because their breeding was more subsidized by the state. As a result of a fall in subsidies, the great increase in the costs of production is recorded and this was reflected in increase of prices of livestock products. It led to reduced consumer demand for beef and pork meat and the great increase of consumers for poultry meat. It was therefore necessary to reduce the numbers of the livestock. The year 2004 meant for livestock production also bad times. This was mainly due to problems in sale because of growing competition in the common EU market. While in 2004 the number was 540.1 thousand heads, in 2009 it was only 472.0 thousand heads which is a decrease of 12.6 %. Breeding pigs in Slovakia has been affected by significant decrease of their numbers. During the monitored period 2004-2009, there was a decrease in the number of pigs by 35.5 %. This decrease is a result of permanent reduction in demand for pork meat and an increase in demand for poultry meat. Number of fowls has not recorded such decline as other livestock. In 2004, in Slovakia 13713.2 thousand heads were bred and by 2009, their number declined by 0.9% which is 13583.3 thousand heads. Sheep as the only livestock recorded during the monitored period an increase from 321.2 thousand heads in 2004 to 377.0 thousand heads in 2009. This increase is conditioned by gradual fertilization of permanent grasslands and also its importance has the promotion of animal husbandry from the EU on the permanent grasslands. Breeding goats in Slovakia is considered to be an additional sector of livestock production which is reflected in their numbers. In 2004, 39.0 thousand heads were bred and in 2009 it was only 35.7 thousand heads which is a decrease of 8.5 %.

Total production of commodities of animal origin during the monitored period had in most of animal products declining development. While the production of cattle in 2004 was 68478 tons of live weight (t. l. w.), it declined by 2009 to about 59.1 % which is 27999 t. l. w. In the case of pigs, the situation was during the years 2004-2009 similar because their production fell from 200108 t. l. w. in 2004 to 86558 t. l. w. in 2009 which is a decrease of 56.7 %. The most rapid decline of production was recorded in the case of sheep up to

68.4 %. Production declined also in the case of goats by 56.4 %. Similarly, poultry production declined from 130822 t. l. w. (2004) to 74212 t. l. w. (2009). The other products such as cow's milk (-8.6 %), sheep's milk (-1.7 %) and sheep wool (-13.2 %) recorded during the monitored period a decline in production.

CONCLUSION

Regarding the area and structure of agricultural land of Slovakia, we recorded during the monitored period 2004-2009 moderate changes related with the decline of the individual forms of agricultural land and thus the overall decrease in agricultural land.

The number of workforce has significantly changed which was showed in a further decrease of the workforce in agriculture. The educational structure of employees slightly improved, but adverse phenomenon remains the increasing number of employees from higher age categories while young employees still decrease and it is assumed that they will not be interested in this economic sector very much.

During the monitored period, we recorded an increase in the number of agricultural subjects by 5.6 %, including natural persons. While there was a decrease in the subjects with legal form of a cooperative, but on the other hand, for the size of agricultural production important are in addition to cooperatives also limited liability companies which numbers raised by 14.5 %. The most produced crops in Slovakia are cereals and oil plants. For most major crops we recorded decline in sown area with the exception of oil plants (an increase of 26.8 %). The decline in sown area was related also with a decline in production of all selected crops except oil plants (an increase of 20.0 %).

Livestock production in Slovakia during the monitored period recorded a decline in the number of almost all species of livestock. The most rapid was decrease in the number of pigs (by 35.5 %). The major decline occurred during the monitored period also in the production of products of animal origin in the case of sheep (-68.4 %), veal (-59.1 %), pork (-56.7 %) and also poultry (-43.3 %).

Translated by Matej Vojtek

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Vývoj poľnohospodárstva Slovenska od vstupu do Európskej únie

V rámci výměry a struktury zemědělské půdy Slovenska byly zaznamenány ve sledovaném období let 2004-2009 mírné změny, které se týkaly poklesu jednotlivých forem zemědělské půdy a s tím souvisel i celkový pokles zemědělské půdy. V počtu pracovních sil došlo výraznějším změnám. Došlo nejen k poklesu pracovních sil v zemědělství, mírně se zlepšila vzdělanostní struktura pracovníků, ale nepříznivým jevem zůstává neustále se zvyšující počet zaměstnanců vyšších věkových kategorií, přičemž mladých racovníků stále ubývá. Během sledovaného období byl zaznamenán nárůst počtu zemědělských podniků o 5,6 %, včetně fyzických osob. Přičemž došlo k poklesu subjektů s právní formou družstvo, ale na druhé straně pro velikost zemědělské produkce jsou kromě družstev významné společnosti s ručením omezeným, jejichž počet naopak stoupl o 14,5 %. Nejpěstovanějšími plodinami na Slovensku jsou obiloviny a olejniny. U většiny hlavních zemědělských plodin byly zaznamenány poklesy výměry osevních ploch, kromě olejnin (nárůst o 26,8 %). S poklesem osevních ploch souvisel i pokles produkce u všech vybraných plodin, kromě olejnin (nárůst o 20,0 %).

V živočišné výrobě na Slovensku byl během sledovaného období zaznamenán pokles počtu téměř všech druhů hospodářských zvířat. Najrapídnejšie klesl počet prasat (o 35,5 %). K velkým poklesem došlo během sledovaného období i v produkci produktů živočišného původu, a to v případě jatečných ovcí (-68,4 %), jatečného skotu (-9,1 %), jatečných prasat (-56,7 %) a také jatečné drůbeže (-43,3 %).

CONSEQUENCES OF TRANSFORMATION OF THE ECONOMY AFTER 1989 AND THEIR IMPACT ON THE LABOUR MARKET IN DIFFERENT DISTRICTS OF THE LIBEREC REGION

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Abstract: *Transformation of the Czech society and economy after 1989 has been a fundamental change that has affected the appearance and economic development of institutions and enterprises. The essence of the transformation process was orientation on the market economy, which is enforcing innovation and technological development in the frame of competitive fight. The transformation thus also influenced the developments in the structure of the national economy by major sectors. Liberec Region, a region with a traditional focus on the economy on the textile and glass industry, he felt this development from its beginnings to the present.*

Key words: *economy, industry, transformation, labour market, employment*

INTRODUCTION

Transformation marked a new international status for the Czech Republic followed by new challenges and responsibilities. In the nineties there have been relatively dynamic changes in regional structures of work-commuting, particularly in relation to the development of different regional labour markets as a result of the restructuring process in this period. Therefore the transformation affected the development of structure of national economy by major sectors. Before the transformation in 1989, industry was a significant part of production, employment and investment. Smaller impact to the national economy had other sectors agriculture and services. During the transition process, the importance of service sector is getting higher as a significant decline in industrial production is partly compensated by production growth of the services. These and many other issues were dealt primarily by Spěváček (2002), Hampl (2001, 2005) Dyba (2008).

CHANGES IN THE LABOUR MARKET IN THE LIBEREC REGION

To assess changes in the labour market in the Liberec Region that occurred during the economic transformation, it is necessary to at first characterize the initial conditions in the structure of employment within different sectors of the economy, before the implementation of economic reforms. Due to the "politics of production self-sufficiency" was the employment in the late eighties in the Czech Republic characterized by a high proportion of workers in manufacturing industries, After 1990, in connection with the transition to a market economy Liberec region experienced major sector changes. Some sectors have been affected by a significant downturn, especially textile and clothing industry and mining and quarrying (mining of uranium ore).

Table 1 shows that in both 1989 and 1999 was mostly observed above-average employment in the secondary sector of the national economy, especially in the district of Ceska Lipa, Jablonec nad Nisou and right behind them district Semily, which in 1989 even increased employment mentioned above of slightly above average to above average. By contrast, in the Liberec district of slightly above-average employment in the secondary sector has an average employment in all three sectors of the economy. This is mainly attributed to change in orientation of the economy, which has shown already in the nineties a different orientation in the production and declining demand for traditional industries, such as the traditional textile and clothing industries, which have previously prevailed. Table 1 therefore contains abbreviations for various manufacturing industries. Glass and Building Materials is marked – SK; Electrical Industry – E; Wood-cutting – D; Engineering – S; Textile - T. The fact that the area outweighs any type of industry is marked as – X.

Tab. 1: Typology of Liberec region districts in accordance with employment in the basic sectors of national economy and the manufacturing industry, as at 31. 12. 1989 and 31. 12. 1999.

Area	Indexes in accordance with employment in different sectors in the national economy		Indexes in accordance with employment in different segments of manufacturing industry	
	1989	1999	1989	1999
Praha	III++	III++	X	X
Liberec Region:				
Ceska Lipa	II++	II++	SK	SK, E
Jablonec nad Nisou	II++	II++	SK, D, S	D, SK
Liberec	II+	0	T, S	X
Semily	II+	II++	T, D, SK	D, T

Source: Publications of the Czech Statistical Office

Baseline indicators for process typology of districts by employment in primary sectors of the economy, the shares of these sectors are in total employment. According to this typology the types of districts were defined as follows:

1) Districts with above-average employment in one sector (e.g. II + +).

2) Districts with a slightly above-average employment in one sector (e.g. II +).

3) Districts with average employment in all sectors (mark 0).

EMPLOYMENT IN SECTORS OF NATIONAL ECONOMY

Table 2 shows the concrete number of employees in different sectors of the economy in each district, compared to the CZ average. These figures show the relationship between different sectors and relation to the previous table.

Tab. 2: Employment in major sectors of the economy in the Liberec Region and its districts in comparison to the full: as at 31. 12. 1989 and 31. 12. 1999.

Area	31. 12. 1989			
	1st Sector	2nd Sector	3rd Sector	Total
CZ	**685 271**	**2 503 052**	**2 072 613**	**5 260 936**
Liberec Region	**22 570**	**125 296**	**78 039**	**225 905**
Ceska Lipa	5 733	28 993	16 780	51 506
Jablonec n. Nisou	3 884	33 018	14 890	51 792
Liberec	7 472	42 164	33 078	82 714
Semily	5 481	21 121	13 291	39 893
Area	**31. 12. 1999**			
	1st Sector	2nd Sector	3rd Sector	Total
CZ	**256 785**	**1 780 244**	**2 731 072**	**4 768 101**
Liberec Region	**9 262**	**93 873**	**104 975**	**208 110**
Ceska Lipa	2 206	24 783	22 228	49 217
Jablonec n. Nisou	1 440	22 984	22 497	46 921
Liberec	2 959	30 140	43 610	76 709
Semily	2 657	15 966	16 640	35 263

Data source: www.czso.cz; Author: self prepared

Due to high employment in the second sector of the national economy, it has been prepared following additional Tables 3 and 4, which shows the employment in the manufacturing industry, which was employed the most people between 1989 and 1999 in the Liberec region. The textile and clothing industries, and also engineering, were gradually growing in the Liberec district. These industries became superior important in 1999 in comparison to the less growing industries, not only due to the inflow of foreign investment.

Tab. 3: Employment in the manufacturing industry in the Czech Republic, Liberec Region and its districts as at 31. 12. 1989 (in thousands).

Area	Total	Food, Tobacco Manu-facturing Industry	Textile, Clothing, ,Leather Manu-facturing Industry	Wood-cutting, Paper Manu-facturing, Polygraphic Industry, etc.	Chemical Industry	Glass Manu-facturing, Ceramic, Porcelain, Building Material Industry	Metallurgy,Metal Manu-facturing Industry	Engi-neering Industry	Electro technical Industry
CZ	**1852,4**	**145,0**	**278,1**	**186,2**	**119,0**	**123,0**	**255,5**	**593,6**	**152,1**
Liberec Region	**103,5**	**5,4**	**22,8**	**16,2**	**2,5**	**22,5**	**3,1**	**24,3**	**6,8**
Ceska Lipa	18,8	1,0	2,2	2,2	0,1	6,6	0,1	4,7	1,9
Jablonec n. Nisou	31,2	0,5	3,5	7,3	0,1	11,0	0,2	6,5	2,2
Liberec	34,1	2,5	10,5	3,8	1,6	2,4	1,2	9,8	2,3
Semily	19,4	1,4	6,7	2,8	0,7	2,5	1,6	3,3	0,4

Data source: www.czso.cz; Author: self prepared

Tab. 4: Employment in the manufacturing industry in the Czech Republic, Liberec Region and its districts as at 31. 12. 1999 (in thousands).

Area	Total	Food, Tobacco Manu-facturing Industry	Textile, Clothing,Leather Manu-facturing Industry	Wood-cutting, Paper Manu-facturing, Polygraphic Industry, etc.	Chemical Industry	Glass Manu-facturing, Ceramic, Porcelain, Building Material Industry	Metallurgy, Metal Manufacturing Industry	Engi-neering Industry	Electro technical Industry
CZ	**1294,6**	**146,5**	**149,8**	**194,1**	**101,9**	**78,0**	**235,4**	**239,8**	**149,1**
Liberec Region	**72,5**	**3,6**	**10,2**	**16,7**	**5,2**	**10,9**	**8,4**	**10,8**	**7,9**
Ceska Lipa	18,9	1,1	1,5	2,2	1,1	5,4	1,4	2,6	3,6
Jabl. n. Nisou	19,3	0,4	1,5	6,6	0,6	4,0	1,8	2,2	1,8
Liberec	21,9	1,3	4,3	3,9	2,0	0,7	3,7	4,4	1,6
Semily	13,5	0,8	2,9	4,0	1,1	0,7	1,5	1,6	0,9

Data source: www.czso.cz; Author: self prepared

Statistical data shows that the traditional sectors of the Liberec Region, textile and clothing industry are still undergoing restructuring which implied to a dramatic downward in the selected period. Glass, ceramics, porcelain and building materials industry is undergoing restructuring. Growth trends in this period clearly showed the chemical industry, metallurgy, metal manufacturing industry and engineering industry. In terms of stability of large enterprises in the metal and engineering industry there is an important development in the transportation industry as the strongest of the Liberec Region. From the second half of the nineties, it is apparent influx of foreign investors and companies which use traditions and skilled labour in the fields of glass and jewellery industry, manufacturing and processing of plastics, machinery and automotive industries. To the structure of economic entities by size of employees were dominating by small and medium enterprises. The total number of employment in enterprises with one hundred or more employees continues to decline.

INDUSTRIAL ACTIVITY AFTER 2000

Between 2000 and 2002 the number of enterprises with prevailing industrial activities increased from the 117 at the 133. Depending on the number of enterprises in the Liberec region, most were represented by engineering, metalworking and transportation industries, followed by industry of glass, ceramics, porcelain, building materials, textiles, rubber and plastics industry. In the years 2000 - 2003 showed the industry as a whole in the Liberec region relatively stable trends, manifested in a number of industries by growing indicators. Some traditional industries - such as textile and clothing industry – continued to undergo attenuation and their share in total turnover and employment decreases. Inhibition activity was partially offset by the creation of new businesses especially in the engineering and automotive industries, rubber and plastic industry, construction and services. After 2004, when the Czech Republic joined the European Union (EU) new possibility has opened and that step contributed to improvement of the labour market situation. This improvement has contributed in way such as creating new job opportunities under the auspices of the employment services and other offerings, consisting of various retraining courses and other opportunities to better use for the job-seekers and for the groups endangered in the labour market. Investing in human resources has become a chance to change for the better. The events, which came at the end of 2008 unfortunately, disrupted these and many other positive trends in the society as well as in the markets. The economic crisis that has reflected the CZ right at the end of 2008 put into trouble a lot of companies and thus the workers, who have suddenly became unemployed. The government and authorities undertaken the measures to improve the situation on the labour market, but the current situation is still far from what we saw before the crisis.

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Projevy transformace hospodářství po roce 1989 a jejich vliv na trh práce v jednotlivých okresech Libereckého kraje

Průmysl Libereckého kraje je koncentrován do průmyslových center, jako je Liberec, Jablonec nad Nisou a Česká Lípa. Okres Semily v porovnání s těmito centry v průmyslové činnosti výrazně zaostává. Také periferie Libereckého kraje můžeme označit za hospodářsky slabé oblasti vykazující vysokou nezaměstnanost, nízkou intenzitu podnikatelských aktivit atd. Mezi ně patří Frýdlantsko, Ralsko a západní část Českolipska.

Průmyslový charakter oblasti zůstal zachován už od druhé poloviny 19. století do současnosti, pouze odvětvová struktura průmyslu se změnila. Poklesl zejména význam těžby a zpracování nerostných surovin. Rozhodující význam pro výši HDP kraje má zpracovatelský průmysl s podílem 38,4 %, což je vůbec nejvyšší hodnota ze všech krajů ČR. Restrukturalizace a inovace průmyslu proběhla hlavně v centrech mikroregionu Liberec, Hrádek nad Nisou a Chrastavě, zemědělství pak ve Frýdlantském výběžku. V Okrese Česká Lípa se dostává do útlumu těžba uranu v Diamu Stráž pod Ralskem a to vede ke značnému uvolňování pracovníků. Řešení bude ve vhodném využití stávajících areálů pro vhodné zpracovatelské či servisní aktivity.

SELECTED PROBLEMS OF LABOUR MARKET IN THE CZECH REPUBLIC… NOT ONLY DURING ECONOMIC RECESSION

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Abstract: *The development of the labour market since 1989 respectively 1991 – the time when the first labour office was established – is a much watched and discussed topic. The concerns are still the same – the primary topics include the development of the unemployment rate, the number of applicants for each vacant position,, etc. In the labour market, however, there are also other topics that deserve attention, which are given in Act no. 435/2004 Coll., on employment. Included among the mentioned topics are: the presence of older persons in the labour market (this topic will become increasingly important with the planned prolongation of the retirement age), foreigners´ employment (is it needed?), use of flexible forms of employment (in the Czech Republic this is still underutilized) and others. Therefore, the aim of the article is to highlight these topics and to propose options to solve these neglected issues.*

Key words: *labour market, economic recession, employment, unemployment*

INTRODUCTION

SITUATION OF THE LABOUR MARKET IN THE CZECH REPUBLIC SINCE THE 90‘S

The (un)employment rate is one of the indicators which is connected with economic development in regions. The development of the labour market in the Czech Republic since 1989 respectively 1991 – when the first labour office was established – is a much watched and discussed topic. Mainly, in the last four years when the world economy was impacted by the recession, the unemployment rate, which is a very important indicator of economic development, has worsened very rapidly (Fig. 1).

There are also other indicators (e.g. specific rates of unemployment) that could be used for monitoring regional development and give deeper insight into the situation in the labour market. These indicators could be used mainly when specific conceptions of regions are planned, such as support of disadvantaged groups in the labour market (elderly people, graduates, etc.), optimization of school systems and support of investors in the regions.

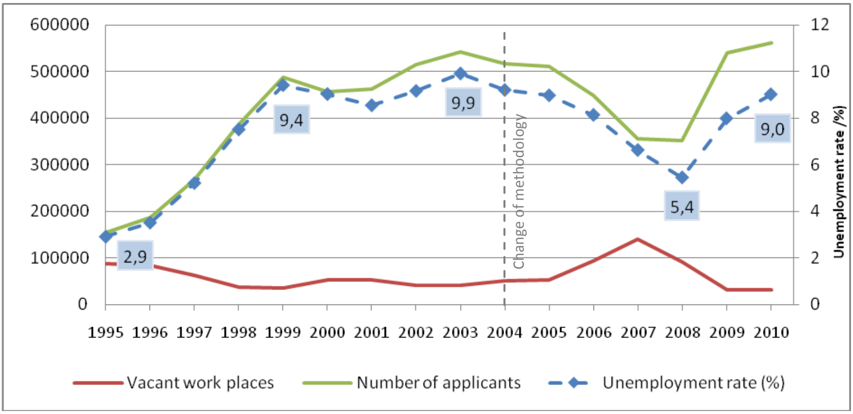

Fig. 1: Development of unemployment rate, vacant positions, number of applicants for work in the Czech Republic (31. 12. 1995–2010)

Source: according to data of Ministry of Labour and Social Affairs

SOURCES AND METHODS

When analysing the changing situation in the labour market it is necessary to evaluate the development of (un)employment (Fišer, Toušek, Janota 2008) and the implementation of regional policy and interregional relations as well.

Basic data about the unemployment structure are available on the website of the Ministry of Labour and Social Affairs and data about the EU countries are available on the Eurostat website or from different studies (ESPON, OECD...).

The aim of the article is to highlight selected long-term, unsolved topics, such as ineffective support of the state to regions with "state support" or dysfunctional active employment policies, and to propose options as to how to solve these neglected issues. The author utilized her strategic planning experience in writing this article. The labour market is one of the main factors used in strategic planning. The elaboration of a study of the labour market in the South-Moravian region (Svobodová et al, 2011) was also a great inspiration for this article.

PROBLEMS OF THE LABOUR MARKET

REGIONS WITH „STATE SUPPORT“

Regions with state support were delimitated in the frame of regional policy in 1999[1]. They were based on an analysis in Strategy of Regional Development[2] and are legislatively embedded in Act no. 248/2000 Coll., on regional development. There are three types of these regions in the current version that was published in 2010 for the period of 2010–2013 as a reaction to the economic recession:

1. Structurally affected regions.
2. Economically weak regions.
3. Regions with above-average unemployment.

The Ministry of Regional Development supports these regions financially. The aim of the support is to strengthen the development potential of the regions and to reduce the gap between economically stronger and problematic regions. However, tens of millions are insufficient help for restructuring (e.g. 50 mil. crowns in 2010) and the situation in problematic regions still has not changed This is shown in Fig. 2 – Development of the unemployment rate in the five districts with the highest unemployment rate at the end of 2010.

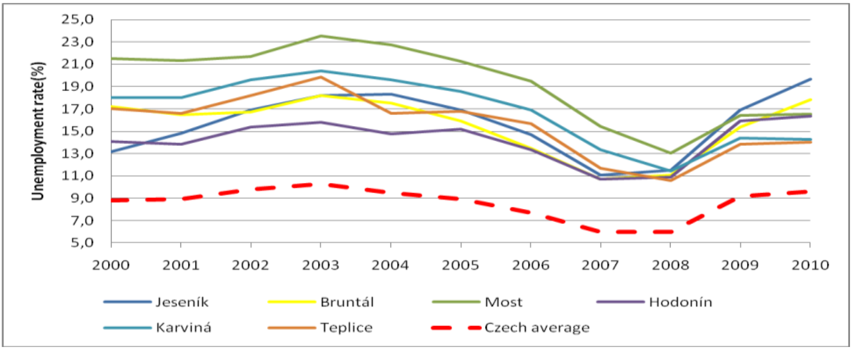

Fig. 2: Development of the unemployment rate in the districts with the worst values (on 31. 12. 2010) in the period 2000–2010

Source: according to data of the Ministry of Labour and Social Affairs

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[1]Definition of regions with concentrated state support for the period 2010–2013. Prague: Ministry of Regional Development, 2010.

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However, the problem is wider. Mainly regions with above-average unemployment are situated on the borders with “weak” regions of Germany and Poland (Fig. 3) and the problem should be solved not only within the Czech Republic, but also in cooperation with the mentioned countries/regions.

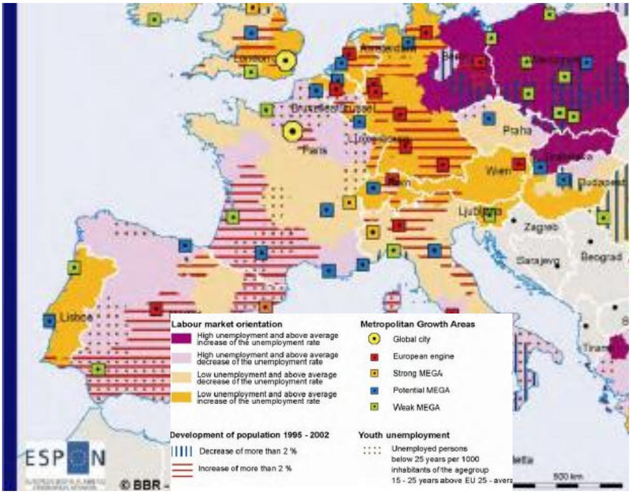

Fig. 3: Labour situation

Source: Integrated Analysis of Transnational and National Territories Based on ESPON Results. Bonn, Germany: ESPON, 2006. Map 3–19, p. 107 [on-line].

ACTIVE EMPLOYMENT POLICY

Tools for an active employment policy are setout in Act 435/2004 Coll., on employment (§ 33). One of the groups who require increased attention is **people over the age of 50.**

In connection with the planned gradual prolongation of the retirement age, a growing proportion in the unemployment rate of people over the age of 50 can be expected. Therefore, increased attention should be devoted to this issue.

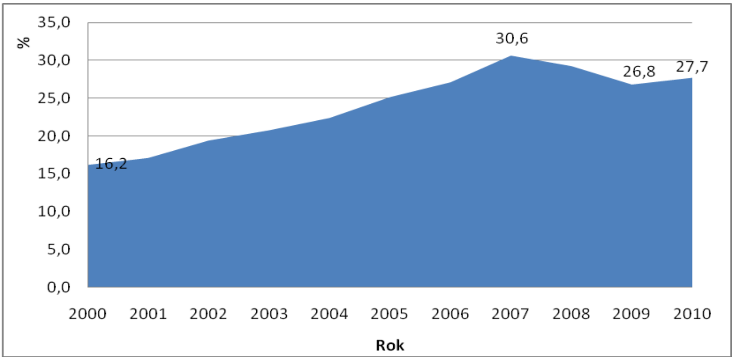

Fig. 4: Proportion ofunemployed people aged 50+ in the Czech Republic in period 2000–2010

Source: according to data of the Ministry of Labour and Social Affairs

Development of this issue (and not only of this) shows that an active employment policy is not very effective. Also the volume of public expenditures, spent on labour market policy interventions compared with the other states of the EU, are very low (Fig. 5).

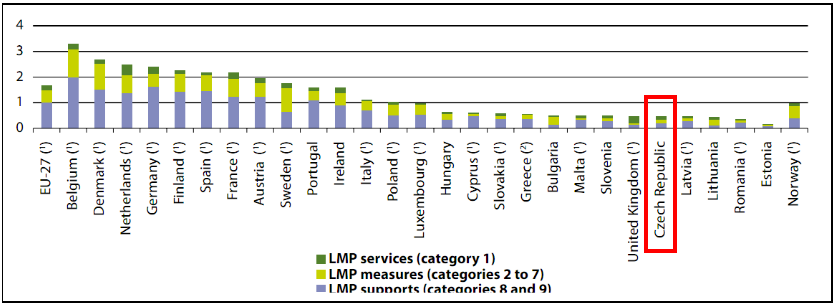

Fig. 5: Public expenditures on labour market policy interventions, 2007

Source: European Yearbook 2010. Labour Market. Brusel: Eurostat, 2010, p. 315

Solution of the mentioned problem could be:

- increased use of **part-time jobs** – it allows gradual transition to pension;
- increased use of **flexible forms of employment** – this method allows employment for persons who would otherwise not be able to work (due to their worsened living situation – seniors, women on maternity, etc.)

- **job sharing,** which is an employment arrangement where typically two people are retained on a part-time or reduced-time basis,
- **co-working** = a style of work involving a shared working environment.

Unfortunately, in comparison with other EU countries, the Czech Republic belongs among the states with the smallest proportion of part-time jobs (only 4,9 % of employees use this type of employment, while, for example, in the Netherlands it is 47,3 % of all employees. The average for the EU is 18,2 %).

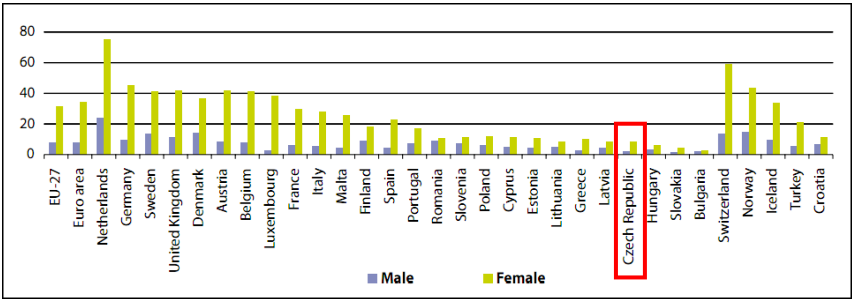

Fig. 6: Persons employed part-time (2008, % of total employment)

Source: European Yearbook 2010. Labour Market. Brusel: Eurostat, 2010, p. 292

WHAT HAPPENED DURING THE „ECONOMIC RECESSION“

Development of the labour market was very favourable until 2008 (Fig. 1). However, at the end of that year the impacts of the global economic recession began to affect our labour market (Toušek, Novák 2010). Negative impacts reflected intensive changes in the labour market (growth of the unemployment rate, a decrease in the number of vacant positions, a change of the employment structure...) which also continued during 2009 and 2010.

The economic recession also amplified some problems that the labour market had faced for a number of years, such as the already mentioned ineffective state support for regions, the unsolved discrepancy between demand and the existing availability of skills of workers (example: South-Moravian region, with Brno as a centre, concentrates workers in the tertiary sector, but lacks skilled workers for some industries) or the employment of unskilled foreigners in the situation where there areabout 9 % of unemployed people.

As for the sectors of the national economy, the primary sector (agriculture, forestry and fisheries) went through an additional decline – even higher than was expected[3]. The secondary sector has also reduced the number of its employees – mainly textile, clothing and leather industries, food industry and building industry. The economic recession affected the tertiary sector as well; however, not as seriously as the other two sectors. According to some studies (Rojíček 2010, Singer 2011), the beginning of 2011 brought better than expected results in the labour market. This could be documented in the actual unemployment rate – at the end of June 8.1 % (in comparison to June 2010 – 8.5 %).

CONCLUSIONS

The development of the labour market is one of indicators reflecting the development of the regions. Although the occurrence of unemployment in the Czech Republic is comparable with other EU states, in some areas we are still lagging (part-time jobs, employment of older persons, etc.). Therefore, in addition to the traditional areas, attention should be given to these new topics. The model we might follow may be found in the more advanced EU countries which have a richer experience with unemployment and the very specific problems of the labour market.

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Vybrané problémy trhu práce… nejen v období ekonomické recese

Vývoj na trhu práce je důležitým ukazatelem indikující rozvoj regionů. Nicméně některé problémy trhu práce jsou dlouhodobě přehlíženy. Mezi tyto problémy patří mimo jiné neefektivní pomoc regionům se soustředěnou podporou státu, malá pozornost věnovaná ohroženým skupinám na trhu práce (zejména starším lidem) nebo možnostem využití flexibilních forem práce.

Ekonomická recese sice vývoj na trhu práce výrazně ovlivnila, tyto problémy ovšem zůstaly opět v pozadí. Ve srovnání se státy EU-15 tak ČR v řešení těchto problémů výrazněji zaostává. Díky ne příliš efektivní regionální politice, změnou struktury úřadů práce nebo prodlužováním odchodu věku do důchodu může navíc dojít k prohlubování těchto problémů.

POST-INDUSTRIAL LANDSCAPE OF BOHEMIA-MORAVIAN FRONTIER REGION – NEW CHALLENGES, NEW OPPORTUNITIES

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Abstract: *Industrial activities of 19th and 20th century signified important development for many regions. The localization of industrial factories or complexes into the places with accessible sources led quickly to the development of accompanying activities like traffic infrastructure or housing and civic amenities of towns. Landscape has been quickly changed from agricultural to the industrial one. Socioeconomic changes at the turn of the 21st century led to the other changes in landscape structure. Structural adjustments influenced importantly industrial regions focused on the textile, glass or food-processing industry. The limitation of processing of original raw materials and orientation on the new industrial forms (such as light industry, high-technologies, research, development of car industry etc.) resulted in an appearance of a new phenomenon – brownfields. The appearance of these shabby areas influenced the aesthetic perception of landscape in a negative way. The aim of the paper is to describe current state of post-industrial landscape and to show possibilities of a further re-use of selected industrial areas in Bohemia-Moravian Frontier Region – Svitavy District. In post-industrial times, when the industrial and mining activities are finished, brownfields are limitations for further development of some areas. The paper presents short analyses of chosen brownfields in the urbanized and rural field in the Bohemia – Moravian region. New development conceptions, which were accepted for this region, can bring new opportunities for economic use.*

Key words: *Bohemia – Moravian Frontier Region; brownfield; opportunities of usage; post-industrial landscape;*

INTRODUCTION

Changes in the perception of transition from industrial landscape to the post-industrial landscape are the reflection of economic transformation in 20th century. Important phenomenon of that transformation was a decrease of heavy industry (finishing of mining, processing of secondary raw-materials) and an orientation to the new types of industry. Transformation changes resulted in desertion of old industrial manufactories and areas which started to dilapidate (so called brownfields). They are used only in a small amount today (especially for light industry, accommodation, or administrative purposes). A brownfield is a developed land (such as a factory site, railroad siding, or former military

base) that is now underused – often vacant or derelict, and sometimes contaminated or feared contaminated.
In Czech, brownfield could be explained as an earlier urbanized area which is now deserted or underused and often damaged in some way (Jackson, 2004). Suchý (2006) characterized brownfields as some real properties (piece of land or objects) which are located in the developed area and which are not used effectively. This area is deprived and sometimes contaminated. Usually, it remains from industrial, agricultural, residential or military activity. Problems of these localities can be solved either by restoration of their function or by supplying by a new usage which is suitable for the localization of brownfields as a part of urbanized areas and landscape. This implies that brownfields are real properties that are not possible to be used without their regeneration. The process of regeneration is often time and financially consuming. Other problems connected with regeneration of brownfields can be polluted area and ownership.
Brownfields in the landscape means problems for their owners who are then supposed to solve them. The most important issues have been summarized in Kadeřábková (2009):

- Economic – these are connected usually with deterioration of business atmosphere, loss of attractiveness of territory for investors, inhabitants or for visitors which can result in the thread to tourism.
- Financial – these issues include declining of tax yield, losing of tax base, declining of revenue from local taxes, reducing of volume of local budgets, risking of ability to finance goods.
- Areal – that means the deprivation of surrounding, support of new building-up.
- Ecological – deepening of ecological damages, under surface water pollution, contamination of technical buildings and infrastructure.
- Social aspects – they are connected with unemployment, social degradation, needs of social benefits, increased crime.

NEW CHALLENGES, NEW OPPORTUNITIES

The subsequent use is the most important factor of brownfields solution. At the Czech Republic, there is a document called *National Strategy of Brownfield Regeneration*, which was legitimized by the Government of the Czech Republic on July 9th, 2008 as the Decree No. 857. The main aim of this Strategy is to create the suitable environment for fast and effective realization of regeneration projects and for the prevention of the emergence of the new brownfields. There are also some barriers for the re-use of the territory that have legislative and economic character, e.g. the high level of candidates for direct investment competition, stricter hygienic and environmental norms. That means significant limitation of localization of some technologies and limitation of cost gap between brownfields and greenfields. That can resulted in excess figure connected with the necessity of execution of demolition work and ecological savings, and clearing up of bindings or technological changes that mean higher costs for the space – this is the reason why many localities are excluded for their small area (Kadeřábková, 2009).

Since 2004, when the Czech Republic joined the European Union, there has been opened new possibilities for brownfields issue solving. The solution is established on the active approach of houseowners and freeholders. They should be opened to solve the process of regeneration with the maximum level of usage of all possible sources (financial, material and human). Brownfields´ regeneration in the Czech Republic operates in a booming economy and is drawing local and international investors' interest. Several conferences have increased the capacity of local developers, investors, stakeholders, policymakers and planners.

The available international aid concentrated mainly on aiding NGOs and European Union aid was aimed at building up the capacity of a national investment promotion agency called CzechInvest. As a result of the EU and other initiatives was an ongoing brownfields research, brownfields have been placed as a priority on the National Development Plan and the Structural Funds Operational programs of the first and second round of structural funding have funded brownfield revitalization. The EU´s broadening of the scope of the Cohesion objective to include the urban dimension and the EU drive for the urban agenda have allowed for the program period 2007-2013 the brownfield issue to be considered within the wider context of integrated urban regeneration. That is improving a single brownfield does not necessarily affect the social or economical basis of a community, which affects the long-term sustainability of projects. Long-term sustainability in brownfield rejuvenation can only be guaranteed by a wider effort supported by broad partnerships. Models of integrated urban regeneration programs should allow the support of such partnerships, demand cooperation and support private business initiatives. Only within the broader integrated urban regeneration approaches can all the aspect of brownfields regeneration be achieved. The ***Integrated Urban Regeneration Programs*** (IPRM) for Czech cities above 50 000 inhabitants are requirements of the 7 Regional operation programs for the NUTS II regions for the period of 2007-13. Other way for financing regeneration of brownfields in small and medium-sized cities is through Structural Funds - Regional Operational programs for the NUTS II regions for the period of 2007-13. On this programs can cities (public administration) funding brownfield revitalization.

Private investors in Czech Republic have shown increasing interest in brownfield revitalization projects, which has resulted in a number of brownfield revitalization projects in prime locations. Investors' interest is spawned by the potential for support from the public sector and a maturing of property markets.

BOHEMIA-MORAVIAN FRONTIER REGION – CASE STUDY

Bohemia – Moravian Frontier Region is a specific area which is spread out along the historical border between two lands – Bohemia and Moravia. It was established in 18th century and it was administratively important from 1848. The border goes from Králický Sněžník to Trojmezí by Old Town under Landštejn and it includes cadastral boundaries of seats and somewhere it is equal to the Main European Watershed (e.g in Svitavy District). During the time of communism, cadastral boundaries have been changed. In one case, two closely adjacent seats were joined together - Česká Radiměř and Moravská Radiměř in Svitavy District. Although, this dividing has been appeared only rarely in historical and historical-geographical meaning, the term Bohemia – Moravian Frontier Region is used for defining of the touristic area at present. New regionalisation of tourism (Vystoupil, 2007) is well known. According to this regionalization, the Czech Republic is divided into touristic regions and areas. Touristic area Bohemia – Moravian Frontier Region is located in the eastern part of the Czech Republic (of Bohemia). From geographical point of view, it is necessary to see the Bohemia – Moravian Frontier Region in its original border length which went through these districts: Ústí nad Orlicí, Svitavy, Blansko, Žďár nad Sázavou, Jihlava, Pelhřimov, Jindřichův Hradec. The surface of the whole region is made up by highlands, hill-countries and mountains. The potency of the seats' development and industry of the region was determined by the localization factors (such as raw materials, transportation and cheep man power). The whole area used to be important in the field of textile industry, glass industry, wood-processing industry and engineering industry. After the restructuring and transformation of industrial activities in the Czech Republic, there have appeared the unused areas (brownfields). In Pardubice region, there are 45 brownfields and in Svitavy District, there are 42 unused areas.

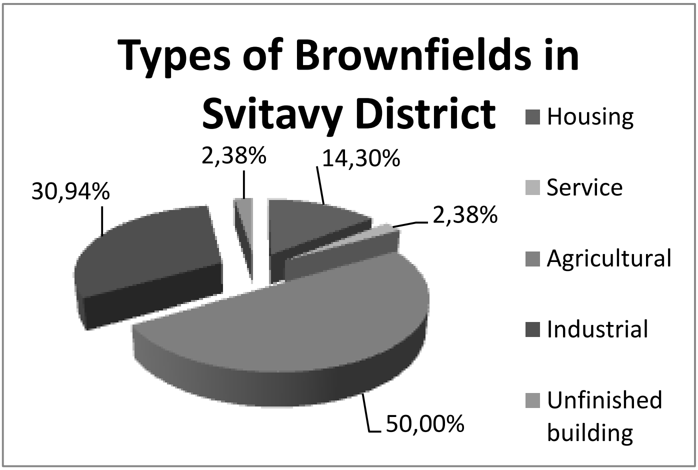

Fig. 1: Types of Brownfields in Svitavy District reflecting their previous usage
Source: Vyhledávací studie pro lokalizaci brownfields na území Pardubického kraje, 2006. State to 31. 12. 2006.

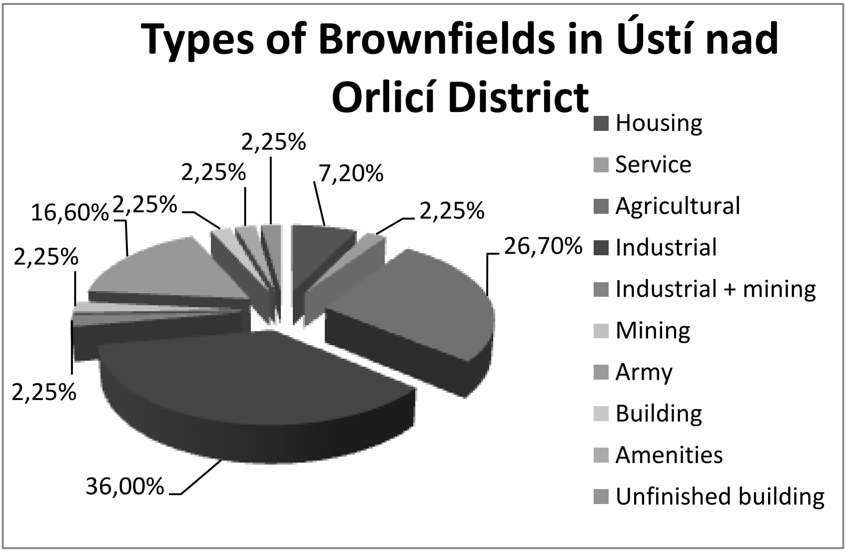

Fig. 2: Types of Brownfields in Ústí nad Orlicí District reflecting thein previous usage
Source: Vyhledávací studie pro lokalizaci brownfields na území Pardubického kraje, 2006. State to 31. 12. 2006.

MULTIFUNCTIONAL EDUCATIONAL, COMMUNITY AND CULTURAL CENTRE FABRIKA SVITAVY – CASE STUDY

Just in the historical centre of the city Svitavy we can find an old industrial building, which had been part of the former factory Vigona Svitavy s. p. (later Vigona Svitavy, a. s.). The industrial building of the former factory – dyeing substances – is a direct part of the rear wing of historical square in Svitavy. This territory is potentially valuable, but for the poor accessibility and the lack of parking places. When Vigona company left the building within the frame of the economies and restructuring (in 2004 Vigona company was bought by the multinational corporation Fibertex), the building started to deteriorate. Abandoned and devastated building had appeared in the historical centre of the city. Due to the extensive reconstruction in 2005 – 2008, which was funded by the European Structural Funds in 92,5%, the building has changed its purpose. The factory has been changed into the educational, informational and cultural centre not only of the city Svitavy city but also of the Svitavy District. The industrial building has been changed into post-industrial building with the new function – environmental, cultural and maintenance of life in the region.

Fig. 3: The Fabrika building in Svitavy, 2006 and 2011
Author: Libor Lněnička, 2006, 2011

The modern library is the main part of the building. It offers the newest information services used for the education and study. We can find there also Internet Cafe, Fabrika restaurant and multifunctional congress hall and a theatre with the capacity of 417 seats. The name Fabrika evokes the original usage of the building as a factory (Czech word Fabrika means factory in English). The building was built up in 1925, by Wilhelm Ettl, businessman in textile industry. The building is specific for its functionalist appearance and it has become the dominant of town (Vařeka, 2008). Fabrika in nowadays is an integral part of the city. The parking places were added to the building. They enable free parking for customers.

CONSLUSION

The presence of unused areas in an urbanized land is a big problem in post-industrial times. Little interest of stakeholders, large financial demands and saving of areas are the cause of the low rate of a subsequent use of these areas. Most of the brownfields are located in an urban fabric which is an attractive place in historical area of the city. From the point of re-use, more than 70% of brownfields in Svitavy District, located in an urban fabric, are used for residential, educational or sport purposes. The result of process of brownfields regeneration in the inner city should be a friendly approach of city administration combined with possibilities for financing, and clarification of property-legal relations of buildings. On the other side, bigger problem is in the rural environment, where agricultural brownfields are deteriorated due to the stained property relations. The stained relations are caused by not well-done privatization in nineties. The paper is a reaction to the still growing need to use the areas in the inner build-up area with regard to the traditional urban conception. New possibilities for area using are closely connected with financial and property-legal relations. Case studies for Svitavy District present that the regeneration of agricultural and industrial bronwfields is possible when all subjects interested in the regeneration will cooperate. With the using of external financial source (such as European Structural Funds or state budget of the Czech Republic), it was allowed to fund the regeneration of brownfields located not only in the area of Svitavy District.

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Postindutriální krajina Českomoravského pomezí – nové výzvy, nové příležitosti

Výskyt nevyužitých ploch v urbanizované krajině je v postindustriální době velký problém. Malý zájem investorů a velké nároky na financování regenerace a sanace území jsou příčinou nízké míry následného využití takovýchto ploch. Většina brownfields se nachází v městské zástavbě, kde atraktivita území (mnohdy v historické zástavbě centra měst) hraje obrovskou roli. Z pohledu opětovného využití je až 70 % brownfileds v okrese Svitavy nacházejících se v městské zástavbě využito pro bytové, vzdělávací či sportovně-relaxační aktivity. Výsledkem celého procesu regenerace brownfields v městských lokalitách musí být vstřícný přístup samosprávy kombinovaný s možnostmi financování, či vyjasněním majetkových práv ke všem nemovitostem. Naproti tomu větší problém nastává v rurálním prostředí, kdy zemědělské brownfields nadále chátrají a následné využití naráží na nevyjasněné majetkové vztahy dané nezdařilou privatizací v 90. letech minulého století. Příspěvek reaguje na stále sílící potřebu využívat všechny plochy uvnitř zástavby s ohledem na tradiční urbanistické koncepce. Nové návrhy využití lokalit vycházejí především z finančních a majetkoprávních aspektů. Případové studie v okrese Svitavy ukázaly, že regenerace průmyslových či zemědělských brownfileds je reálná a možná při spolupráci všech zainteresovaných subjektů. Při využití externích finančních zdrojů (ze strukturálních fondů EU či Státního rozpočtu ČR) je možné financovat nákladné regenerace ostatních lokalit nacházejících se nejen na území okresu Svitavy.

SPATIAL CHANGES OF HOUSE BUILDING IN BRATISLAVA CITY

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Abstract: *Bratislava as a post-communistic city with its background is dynamically developing and in its intra-urban structure there are lots of changes going on caused by transformation processes with different intensity in particular city districts. The main element of the functional and morphological spatial structure of a city is a housing infrastructure. Housing and its quality as a one of the basic human needs and a structural element of a city is therefore reflected in instant changes of its inner and outer space. The house building in the past influenced by socialistic ideologies, development of house building during the economic crises, tendencies and its movement in the future therefore belongs to the most actual interdisciplinary themes paying attention of professionals as a sociologists, city planners, architects and geographers as well. The aim of the article is to show the changes of intra-urban structure of the capital of SR and briefly evaluate spatial distribution of house building in Bratislava related to its market price.*

Key words: *apartments, house building, intra-urban structure, transformation processes*

INTRODUCTION

We find a huge instability in the development of house building in Bratislava during the post-socialist period which is characterized by economic and political changes. We can find its roots in changes of the influencers in house building field. The state influence on house building financing got weaker. There is a state support, but it can be defined just as state housing allowance to building savings and mortgage loans for living. For this purpose there was an institution created called State Housing Development Fund. There are also more forms of state support as a state donation for acquisition of apartment buildings, innovation of housing stock and technical amenities [1]. House building and the commercialization was recently implemented mostly by private sector and as a one of the main actors was forming the house infrastructure that is the basic element of the functional and morphological spatial structure of Bratislava. The level of house building during 2005-2010 (26 682 completed apartments) supported by private sector, which is sensitive to market fluctuation, didn't reach the intensity of house building during the socialistic era. During this period the block-house building was intensified (missing the appropriate amenities) [2] and was influenced by increasing economics and by the stable political situation in the country, the city was horizontally spreading and vertically growing.

METHODOLOGY

In this article we are talking about the house building issue in the capital of Slovakia, Bratislava. As it can be broadly drafted issue, we stayed concerned just about the changing intra-urban structure of Bratislava, brief interpretation of spatial distribution of completed apartments and the analyses of price level trends of new apartment complexes during the 2008-2010.

In the case of interpretation of the spatial distribution of completed apartments the necessary data was provided by Statistical Office of the Slovak Republic (SOSR). According to SOSR the completed apartments are those, which using ability was confirmed by flat-inspection statement. These are the completed apartments in buildings determined for living that are living houses, family houses and polyfunctional buildings, including the apartments in the buildings that are not determined for living, for example administration buildings, banks, post offices and stations. The completed apartments include apartments made by new construction, reconstruction or by other building modification.

The object of the apartment average price analyses were the house building projects with the number of apartments 25 and more, which were in the phase of sale, construction or investment intention during the particular years. Data were collected in 1. quarter of each year. We have worked with the data available in press, websites of particular developers, estate agencies as well as with the data obtained by phone or email communication. As it was the price level analysis, which is usually considered as a very sensitive affair, in many cases the prices for square meter were not available. In these cases the average price was calculated from available data. The prices of 2008 were converted from Slovak crowns to Euro by course in 12th month 2008 (31,291 Skk/1 EUR).

The apartment price for square meter was calculated as a final price, which the client has to pay for square meter of living area, so the price included all the necessary charges (estate part, common space, cellar, etc.). The area of balcony, terrace, loggia or front garden during the price calculating wasn’t considered. The price of an apartment was divided only by the apartment living area. The garage is mostly sold on its own. If the price of the garage was part of the apartment price, we subtracted the estimated price of the garage (11 618

€), so that the data could be comparable. During the calculation of the average price we used the weighted arithmetic mean (if the data were available the weights were the areas of the apartments). If the data were missing we used the arithmetic mean.

THE FACTORS INFLUENCING THE HOUSE BUILDING

While the natural, social-political and economic factors were the most important in distribution of the housing stock in the past [2] [3], today it is a land price in relation with its location, housing market, a rise of an importance of city districts municipalities in Bratislava, social polarization of the city population and ecological aspects of new living locations [3], investors‘ interests , vacant areas in attractive city locations, public demand, institutionalization.

TRANSFORMATION PROCESSES CHANGING THE INTRA-URBAN CITY STRUCTURE

When we consider the house building in post socialistic era in Bratislava we have to follow the most important transformation processes that have been changing intra-urban structure of the city. According to [4], for geographical analysis of post communist cities it is very important to recognize the processes changing their intra-urban structures, the simple description of a city spatial changes is not enough. In classification of the changes in morphological, functional and social-demographic structure of the city it is necessary to capture their mechanism. On the basis of the data stated below we are going to allocate some of the processes to these changes. The processes are connected to house building and are influencing the intra urban structure of Bratislava. [5] included and later characterized the most identified transformation processes in the individual city zones.

Tab. 1: The most identified transformation processes and their projection to partially intra urban structures and individual city zones

	Intra urban structure		
	Morphological	Functional	Social-demographic
Transformation process	Suburbanization (E) Gentrification (B, A) Revitalization (A, B, C, D, E) Commercialization (A, B, C, D E) Recession a grounding (B, D, E) Manhattanization(A) Intensification (A, B, D, E)	Suburbanization (E) Commercialization(A, B, C, D E) Deindustrialization (B) Demilitarization (B) Sacralization (A, B, C, D, E) Functional fragmentation (A, B, E) Manhattanization (A)	Suburbanization (E) Gentrification(B, A) Segregation (B, D, E) Separation (A, B, E) Status regression (D)

Source: [4], [5], [6], modified by authors

Zones: A – center, B – inner city, C – villa house zone, D – block building zone, E – peripheral zone

The transformation processes don't have to be going on individually, but also in conjunction with other ones. One of those is *manhattanization*, which is going on (most of the time chaotically) in the city center [6] and it is often in conjunction with *commercialization*, which causes changes in morphological and functional intra urban structure (for example CBC, Aupark Tower, Tower 115) also happening in all city zones. Tall building construction with residential function is bound to wide city center and its block building estates (for example Oberon, Tri Veže, Vienna Gate, River Park). *Revitalization* is the process which can be happening in all city zones and it is caused by *gentrification* and *functional transformation*. Revitalization changes are naturally massive in central zone, where we can find mostly older buildings (for example reconstruction of City Gate in Old town, polyfunctional center construction on old industrial campuses in Ružinov and Eurovea on river Danube embankment). In all inner city we can observe the process of *intensification*, when the less built-up areas are finally used. *Separation* is happening in brownstone districts in Bratislava, mostly in uphill, thinner built up areas, close to the city center with the city view (for example Villa Koliba, Koliba Minergo in Koliba, Mestské vily Horský Park close to Slavín). The important increasing of residential areas in Bratislava districts with rural character (Záhorská Bystrica, Devínska Nová Ves) can be the result of *suburbanization* (pic. 2), even though they are located within the city borders and are spatially separated from city core [10]. Currently happening changes of existing intra urban structures and intensification of less used or empty areas is heading to qualitative development of particular city spaces, mostly in city center and surrounding areas [6].

The second part of the article is dedicated to the description and simple analysis of the following features – spatial distribution of completed apartments in Bratislava and look on the average market price trends of new house in Bratislava.

SPATIAL DISTRIBUTION OF THE NEW HOUSE BUILDING IN BRATISLAVA

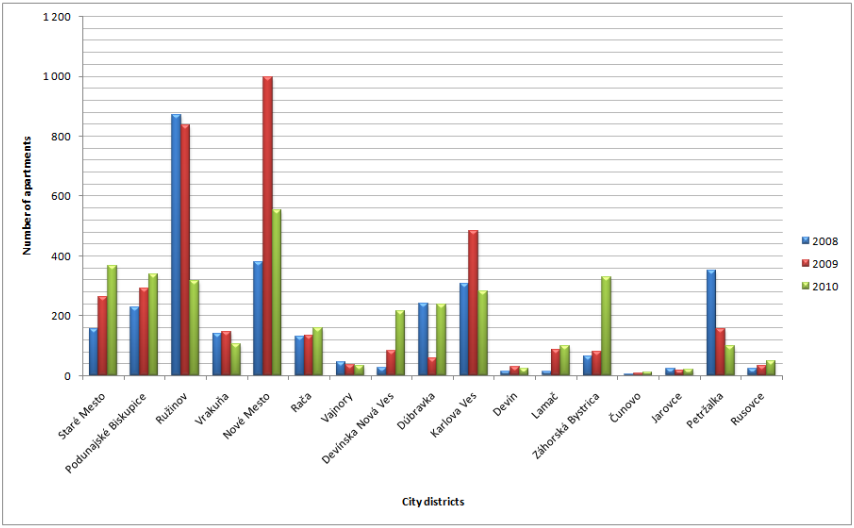
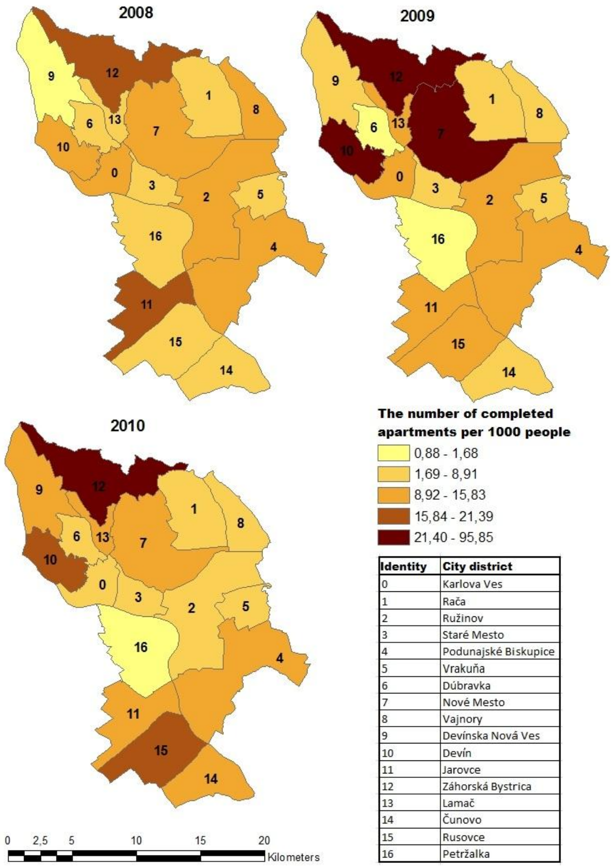


Fig. 1: The number of apartments completed in Bratislava city districts during 2008–2010
Source: [7], 2011, modified

According to SOSR [7] there were 16 767 completed apartments in all Bratislava city districts during the period 2008-2010, the most in 2009, 5982 apartments. The economy of the Slovak republic was highly affected by the huge recession wave in 2009, what we can observe also in the number of planned, under construction and partially completed projects of house building. The crisis didn't have a huge effect on increasing number of completed apartments, but it hit developers planning new projects, what can be proved by the data showing the keen decline of the number of launching apartments from 8 117 in 2008 to 4 353 in 2009. The number of under the construction apartments (16 635) was culminating in 2008, during the crisis softly declined into 14 570 in 2010.



Identity	City district
0	Karlova Ves
1	Rača
2	Ružinov
3	Staré Mesto
4	Podunajské Biskupice
5	Vrakuňa
6	Dúbravka
7	Nové Mesto
8	Vajnory
9	Devínska Nová Ves
10	Devín
11	Jarovce
12	Záhorská Bystrica
13	Lamač
14	Čunovo
15	Rusovce
16	Petržalka

Fig. 2: The volume of house building in respective Bratislava districts in 2008-2010
Source: [7], modified by authors

The increasing the number of completed apartments during the period 2008-2010 didn't have a steady continuance in particular city districts. The city districts Čunovo, Jarovce, Vajnory, Devín, Rusovce are characterized by small number of completed apartments during the 2008-2010 compared to the rest of the city districts. The districts stated above are located in longer distance from city center, are separated from compact city and have a rural character (Picture

1). The differences in values expressed as rate of number of apartments with respect to the population number (nr. of apartments over 1000 inhabitants) are not negligible, Devín part is characterized by high rate (Picture 2). Záhorská Bystrica with its rural character and built-up area which doesn't interlock the compact city has relatively high number of completed apartments, mostly in 2010. Considering the number of its inhabitants the completed house building here is very intense (Picture 2).

In the city districts located close to city center – Ružinov, Petržalka, Karlova Ves during 2008 and 2009 the number of apartments increased, the decay was noticed in 2010. The highest growth of the number of apartments in one year was noticed in city district Nové Mesto, where in 2009 almost 1000 apartments accrued. During the following year the number of completed apartments in this city district has fallen to the half. The biggest projects are in city district Ružinov is Eurovea (2010 – 235 apartments), Jégeho Alej (2009 – 506 apartments) and Eden Park (278 apartments in 2009). In 2009 633 apartments in city district Nové Mesto accrued in huge polyfunctional project Tri Veže. Vienna Gate in city district Petržalka with 296 apartments accrued in 2009. There were many new apartments growing in city districts Staré Mesto (River Park with 138 apartments) and also in difficult transport accessible district Podunajské Biskupice, where the most significant increase in number of apartments was in 2010 (Picture 1). The central part of the city (excluding the city district Nové Mesto) considering the number of inhabitants of its districts is characterized by low number of new apartments. There were mostly empty areas used for the new house building development, but the new approach has appeared recently that prefers building new projects on old industrial areas (brownfields) [8].

THE MARKET PRICE LEVEL OF APARTMENTS IN NEW HOUSE BUILDINGS

According to [9] the average price of an apartment for m^2 in Bratislava has been increasing since 2005 and gained the top in 2008 (1 972 Euro/ m^2). During the following two years the price has fallen, but the decrease wasn't so significant to get close to the prices from 2005, when it oscillated around 1 148 Euro. In 2009 was the average price of apartment in new house building 1 749 EUR for m^2 and in 2010 1 726 EUR for m^2.

The data from our own research are showing that the highest price of the apartments in the new house buildings was in 2009. Here we have to point to the fact that while our data were collected in 1. quarter in respective years, the data by NBS were collected during the whole year. High prices of the apartments in 1. quarter in 2009 in our research confirm the level of the prices of apartments in 2008 according to NBS, when they were not pressed down by the crisis yet. The high prices of the apartments have fallen later during 2009.

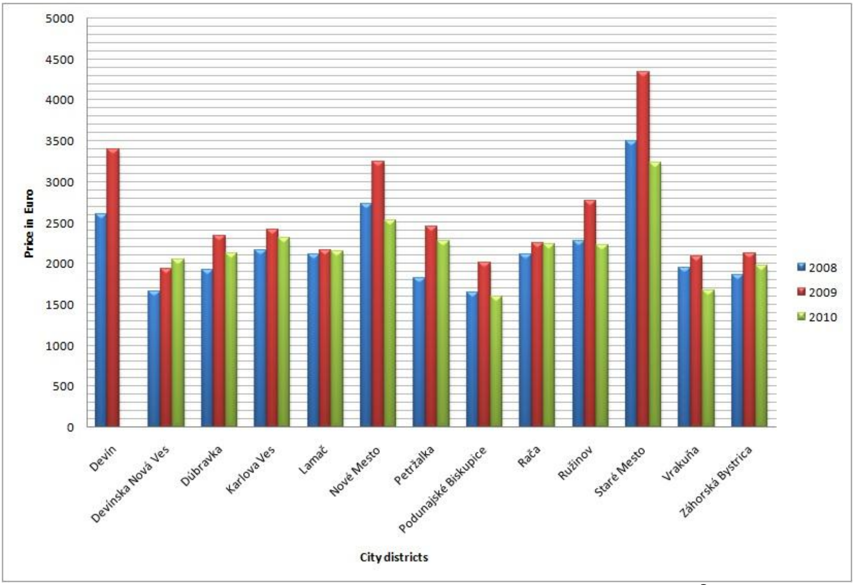


Fig. 3: The average market prices of new house buildings for m^2 in respective Bratislava city districts in 2008-2010
Source: data obtained by own research work, modified by authors

The highest average prices of the new apartments are naturally in the city center in city district Staré Mesto. The prices of the new apartments running over the average price levels of other city districts are in Devín and Nové Mesto (Picture 3). The new apartments in Nové Mesto are overpriced thanks to exclusive location Koliba with the best city view, low built up area, direct nature contact. A similar explanation we can use in the case of Devín, where the prices are high as well. Devín is very attractive location with rural character close to natural and cultural landmarks with good amenities and relatively good transport connection with the city center.

The lowest prices of new apartments are in Podunajské Biskupice, Vrakuňa, Devínska Nová Ves and Záhorská Bystrica. These city districts are edge parts of the city, the demand for apartments in these locations is much lower than in the locations closer to the city center with much better transport connection.

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Priestorové rozmiestnenie bytovej výstavby v intraviláne mesta Bratislava

Bratislava ako postsocialistické mesto sa s jej zázemím dynamicky rozvíja a v intraurbánnej štruktúre podstupuje mnoho zmien, ktoré sú podmienené transformačnými procesmi prebiehajúcimi v jednotlivých častiach mesta rozličnou intenzitou. Základným elementom funkčnej a morfologickej priestorovej štruktúry mesta je bytová infraštruktúra. Bývanie a jeho kvalita ako jedna zo základných ľudských potrieb a štruktúrny prvok mesta je preto reflektované v prebiehajúcich premenách jeho vnútorného a vonkajšieho priestoru. Vývoj bytovej výstavby v minulosti pod vplyvom socialistických ideológií ako i rozvoj v doznievajúcej ekonomickej kríze, tendencie a smery rozvoja v budúcnosti preto patrí k aktuálnym interdisciplinárnym témam vyžadujúcim si pozornosť odborníkov celej vedeckej obce sociológov, urbanistov, architektov, no v neposlednom rade geografov.

Pre plánovanie a skvalitňovanie urbánneho prostredia, ako aj pre identifikáciu možností a potenciálu rozvoja bytovej infraštruktúry v priestore mesta je dôležité dôkladne analyzovať problematiku priestorovej diferenciácie jeho existujúcej obytnej zástavby. Cieľom výskumu je preto poukázať na priestorovú distribúciu bytovej výstavby na území mesta Bratislava vo vzťahu k jej trhovej cene a následne stručne poukázať na meniacu sa intraurbánnu štruktúru hlavného mesta SR.

FORMING OF MICROREGIONAL ASSOCIATIONS (MRA) IN SLOVAKIA

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Abstract: *Paper deals with the particular phases of forming the microregional associations in conditions of the Slovak republic. Microregional associations and their* *practical analysis became research issue nowadays. Authors of this paper assess the process of forming of microregional associations in Slovakia since the 1990s to current situation. They do not pay attention only to the dynamics of this process, but also to specialisation and structure of particular associations. On our territory the microregional associations occurred first in a form of inter-communal cooperation. The managements of the microregional associations started focus on utilising external financial sources from diverse grant schemes. In the last years the microregional associations are formed mostly with the view of joining the network of local action groups (LAGs).*

Key words: *Microregion, microregional association (MRA), Slovakia, local action group, communal cooperation*

INTRODUCTION

Microregions (regional associations of local self-governments) can represent an effective tool of spatial development on the subregional (microregional) level. Studying the particular steps and ongoing progress within the microregional associations in Slovakia, however, is a quite complex task. Comparing with the neighbouring countries there is lack of legislation adjusting the observed problem and no an institution that monitors such a process. Until 2007, the Slovak Environmental Agency (SEA) in Banská Bystrica registered the grant applicants (potential beneficiaries) within the state Village Recovery Programme in Slovakia (Program obnovy dediny). The registry mentioned above represented the only for public available database of microregions dealing with spatial development in Slovakia. As a consequence of restrictive measures, the SEA stopped monitoring this process and there is no official authority responsible directly for this kind of agenda in Slovakia. Furthermore, the attention of geographical research community is quite little problem. In case any authors are studying microregional associations, they focus exclusively on their application task.

In this paper, the authors focused on the process of creation of microregional associations in Slovakia whereas making use of the information from public accessible sources. For analysing the MRAs we applied accessible database of the Slovak Environmental Agency (SEA), Slovak centralised government registries of public and private bodies (portal ives.sk), Database of the Local Action Groups in Slovakia (www.nsrv.sk) and the data gained during own research.

MICROREGIONS AND MICROREGIONAL ASSOCIATIONS

There does not exist a legal (official) definition of the term “microregion” in Slovakia. On one hand, microregion denotes “geographically restricted area that has some common features (natural, demographical, historical, cultural, etc.). However on the other hand, this term also denotes “voluntary association of urban and rural self-government with the objective of solving common problems together and with the aim of searching common ways of development of the relevant area” [1, 3, 15].

In most of the cases geography avoids to define the term “microregion“ („mikroregión“ – in Slovak). Urban and rural geographers and experts in the field of public service the microregion understand as an administrative unit on the level between the level of urban and rural self-governments and the level of districts (counties, regions). Then the term “natural microregions” is widely used for such microregions. This attitude is advocated by Slavík and Bačík [4], Slavík, Kožuch and Bačík [5], or Sloboda [6, 7, 8, 9] or Sloboda and Dostál [10, 11, 12]. The project of Czech nodal microregions was presented by geographers Halás, Kladivo, Šimáček and Mintálová [2]. Geographers dealing with rural landscape pay attention to the potential of microregional associationsin the development of the countryside. They focus on the analysis of their activities and relevance for the development of a particular microregion in application level. The Works of for example Spišiak [13, 14, 15, 16, 17, 18, 19, 20, 21], Tvrdoňová, Piknová and Reed [22], Klamár [3] and other works can be categorised in this group.

We believe that the microregion can be simply defined as a ***purpose-defined (spatial) unit consisting of two or more communities (generally not exceeding the number of communities within a district), which are homogeneous in one spatial or human-geographical feature, or are defined in the common development objective (plan, development project, etc.)***. Therefore it is a spatial unit composed of towns which are connected by a common spatial (geographical) or social aspect (feature) or development plan.

Microregional association is a legal entity (legal person) established for the purpose of achieving common solutions whereas increasing the level of economic development, social development and spatial development of the region. Subject-matter of activities of such an association is defined by the Act on as support of regional development No. 539/2008 of Coll., usually in the fields of social environment (mostly collecting, transport and disposal of communal waste, conducting and treatment of sewage), municipal transport, education, culture and local tourism; with common activities the association helps to create favourable conditions for fulfilling the tasks of the communes as well as those of the higher territorial unit. Rural microregional associations are also created in order to prepare effectively the development programs with the objective of increasing the quality of rural life.

To distinguish these communes associations from other (civil or interest) associations where their members can be natural or other legal persons, or possibly from regional associations (bigger part of the area – region), the term **microregional communal association** is used, i.e. its shorter version **microregions.** Frequently the term “microregion“occurs in the official name of such an association because the associated urban and rural entities want to underline their affiliation with the particular geographically delimited territory [1]. This shorter term we recommend to use only for the area where the particular microregional association, and thus it is not intended for the particular legal person who is dealing with the regional development of this area.

To enable the entrance into legal actions of a microregional association it has to have a form of legal person. MRA as a legal person is founded by registration at the respective body according to the type of association (mentioned bellow). Microregional or possibly interest communal associations can be registered (as legal persons):

a) at the Ministry of Interior of the Slovak republic according to the Act. No. 83/1990 Coll. - on Association of the Citizens, later amended as **civil association**,

b) at the District State Administration Offices (OÚ) in the regional capitals – previously at the Regional State Administration Offices (KÚ) – sections of General Interior Government in the Register of interest associations of legal persons in accordance with § 20b - f of the Act. Of Slovak National Council No. 369/1990 Coll. on local self-government later amended as **communal association,**

c) In accordance with § 20i section 2 of the Act. No. 40/1964 Coll., of the valid civil code as **interest association of legal persons** at the district area of the region capital town (Okresný úrad v sidle kraja).

FORMING AND DEVELOPMENT OF MICROREGIONAL ASSOCIATIONS (MRAs)

1st Phase

First microregional associations were formed in 1992 on our territory. That time three microregional associations were founded in the districts of Košice-environs, Levice and Galanta. In the following years only a small number of associations were founded. They were registered mostly at regional offices as communal associations and interest associations of legal entities. Driving force of these groupings were mostly smaller towns and villages in rural areas, therefore mostly rural microregions were founded (Klamár, 2007). Under conditions of lack of sources and great number of small rural communities (villages) the main reason for creating microregions is to overload the inability of small rural communities to ensure complex range of services and effective promoting of their territory. Cooperation within the microregions is oriented towards the fields related the environment, common promoting of the territory and local infrastructure.

2nd Phase

A marked increase in the number of registered entities occurred after 1998, particularly in connection with the start of the pre-accession European Union grants. It was also possible to draw a financial subsidy from the Village Recovery Programme, which has provides small financial grants for the renovation and development of villages. Moreover, in 2000, a civic association based Rural Parliament (VIPA) as a platform to support rural initiatives. In 1998–2000 there were registered successively 10, 25 and 42 new micro-regional associations. Compared with previous period, micro-regional associations are increasingly starting to be formed in the form of civil associations that are registered with the Ministry of Interior of the Slovak republic. This legal form enable their members may also be individuals natural persons. A large number of new associations reported in 2003, which confirms the attempt to use pre-accession assistance (fig. 1).

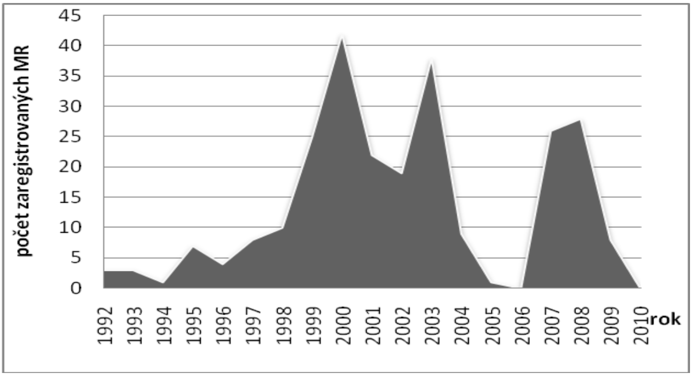


Fig. 1: Process of registration of newly created MRA in Slovakia in respective years

Source: www.sazp.sk, http://portal.ives.sk/registre/start.do, www.nsrv.sk, own research

After Slovakia joined the European Union new micro-regional associations are created almost exclusively as civil associations. The main objective is the use of financial grants of the European Union intended primarily for rural development. Because of this, new civil associations are created of which the structure is more or less in line with EU criteria for financial support of microregions. Thus 36 out of the 72 of the recently created MRA have called themselves with the “local action group (LAG)”. Local action groups represent a specific form of public-private partnership supported directly from European sources. Their purpose is to develop microregion through the implementation of predetermined priorities. Unlike Western Europe, where support for such partnerships through the LEADER approach works for more than 10 years, Slovakia has joined this initiative for the first time only in this programming period. Status of the local action group has been awarded to 29 microregional associations which can announce calls for its members and projects co-financed by funds of the European Union (Fig. 3).

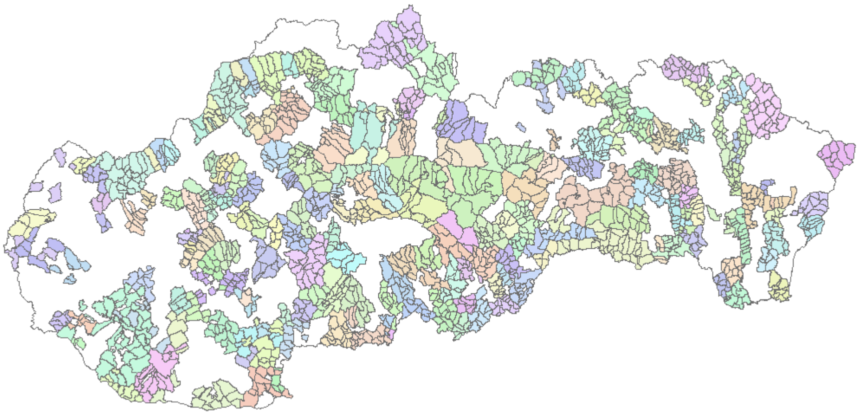
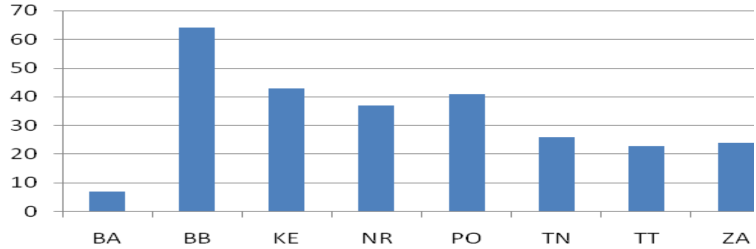


Fig. 2: Microregional associations in Slovakia (without LAG)
Source: www.sazp.sk, http://portal.ives.sk/registre/start.do, www.nsrv.sk, own research

Tab. 1: Number of MRAs in relevant regions of the SR, current state



Source: www.sazp.sk, http://portal.ives.sk/registre/start.do, www.nsrv.sk, own research

SPATIAL STRUCTURE OF MRA

As shown in Fig. 1 and Tab. 1, the spatial structure of the MRA in Slovakia is very heterogeneous. The largest concentration of MRA is the Region of Banská Bystrica, Prešov and Košice. This relates to the action of VIPA which is located in Banská Bystrica and plays an important role in supporting rural initiatives. A density microregional e-network is highest in the less developed Slovak regions. Communal associations arose there mainly as a platform for joint solutions of the problems of many small communities that individually do not have sufficient capacity to deal with them. In developed regions of Slovakia the concentration of MRZ is lower and they are focused mainly on promoting the area. In connection with the establishment and support of local action groups the situation is changing, the association applying for the status of local action groups in Slovakia are more evenly dispersed. Many of the associations applying for the status of LAG are associations of earlier founded microregions.

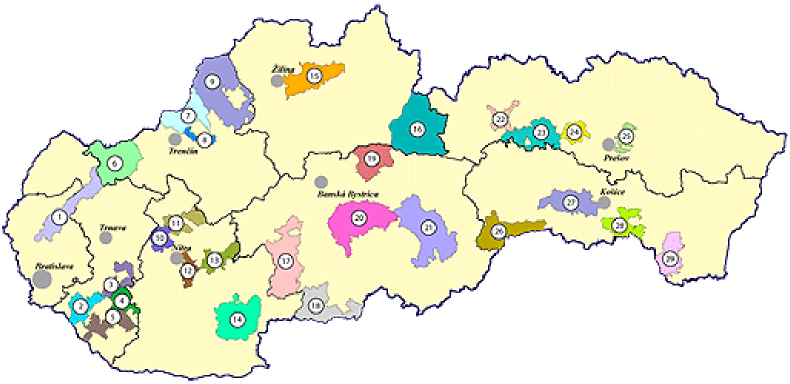


Fig. 3: Local action groups in Slovakia (2011)
Source: www.nsrv.sk

CONCLUSION

Forming of microregional structures in Slovakia is a specific process and we can nowadays just hardly estimate its consequent development. After the introductory phase where the associations were created in the need for ensuring with dignity the basic needs of population and in effort for promoting the area, another phase of attempt for grant awarding arose. Microregional associations were created with the objective of development and renewal of regions, mostly by the support from national as well as pre-accession grants. After accession to the European Union, the process of creating new microregional associations is decelerating and mostly public-private partnerships are created with objective of drawing funds from the financial resources aimed for rural development.

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Formovanie mikroregionálnych združení na Slovensku

Na Slovensku nemáme zákonnú definíciu pojmu mikroregión. Pod mikroregiónom sa na jednej strane označuje „geograficky ohraničené územie, ktoré má nejaké spoločné charakteristiky (prírodné, demografické, historické, kultúrne a pod.)“. Týmto pojmom sa však na druhej strane tiež označuje „dobrovoľné združenie obcí a miest za účelom riešenia spoločných problémov a za účelom hľadania spoločných ciest rozvoja príslušného územia“. Najvšeobecnejšie sa mikroregión dá vyčleniť ako účelovo vymedzený útvar pozostávajúci z menšieho počtu obcí homogénnych v určitej priestorovej alebo humánno-geografickej charakteristike, alebo (v) spoločnom rozvojovom zámere (pláne, projekte rozvoja). Mikroregionálne združenie je právnická osoba založená na účely dosiahnutia spoločných riešení pri zvyšovaní úrovne hospodárskeho rozvoja, sociálneho rozvoja a územného rozvoja regiónu. Formovanie mikroregionálnych štruktúr na Slovensku je špecifický proces, ktorého ďalší vývoj je v súčasnosti len ťažko odhadnuteľný. V procese vývoja môžeme identifikovať tri etapy. Po úvodnom štádiu, kedy združenia vznikali z potreby dôstojne zabezpečiť základné potreby obyvateľov a snahy o propagáciu územia, nastalo obdobie snahy o zisk grantov. Mikroregionálne združenia vznikali s cieľom rozvoja a renovácie regiónov najmä s podporou národných, ale aj predvstupových grantov. Po vstupe do Európskej únie sa proces vzniku nových mikroregionálnych združení spomaľuje a vznikajú najmä verejno-súkromné partnerstvá so zámerom čerpania grantov z prostriedkov EÚ určených pre rozvoj vidieka. Súčasná medziobecná spolupráca sa na mikroregionálnej úrovni sústredí na vytváranie miestnych akčných skupín, ktoré môžu priamo implementovať projekty z programy LEADER.

HUMAN-GEOGRAPHIC RESEARCH IN THE MICRO-REGION OF ČERVENÝ KAMEŇ

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Abstract: *Studying rural landscape needs to be addressed comprehensively, i.e. in relation to economic, social, cultural problems, and not least environmental problems. Increasingly, it appears (and it is also partly applied) necessary to apply rural area sustainability criteria in the current research, but also the historical aspects. We applied the addressed the issue of sustainability of a rural area in the micro-region of the Červený Kameň village, which is located near the town of Pezinok, Bratislava region. The micro-region has been a affected by the impact of the Bratislava city suburbanization. There are 9 municipalities within the micro-region: Báhoň, Budmerice, Častá, Doľany, Dubová, Jablonec, Píla, Štefanová, Vištuk. Basic information for fulfilling the essential requirements of sustainable development derives from the survey of perceptions of the local area by the inhabitants of the municipalities.*

Key words: *micro-region, human geography, sub-urbanization, life quality*

INTRODUCTION

Research of a rural landscape has got under focus of several disciplines, from which human geography holds an important position. In Slovakia, there are several institutions conducting research in this area which deal with sustainability and development.

In particular, there are scientific research institutions and universities having a great human potential for addressing rural research. Major universities with a strong focus on natural sciences comprise Comenius University in Bratislava and Pavol Jozef Šafárik University in Košice. Geographic department at these institutions carried out a considerable number of project oriented towards development of rural landscape. The research was undertaken in model regions that are now proven representative not only from theoretical and methodological point of view but also from the application point of view, i.e. that research results are applicable in practice.

The research presented in the paper uses the idea of micro-regions or micro-regional associations, which were officially established, or they were founded on the basis of several geographical criteria. A micro-region can be defined as an area subject to larger regions and regions on a higher hierarchical level *(Dubcová et al. 2001, Klamár 2005, Toušek et al 2005)*. The term is used in relation to the term region and its hierarchisation on the basis of summation characteristics. Micro-region is often referred to the identification of a nodal region, i.e. shows aspects of hierarchical organization. This means subjection and gravity of sub-regions (micro-regions) towards a centre or several nodes. Several researchers differentiate two or three levels of the micro-regions: (i) the micro-regions on the first level are similar to gravitational areas of settlement centres of local importance, (ii) the micro-regions on the second level comprise current districts and micro-regions, (iii) the micro-regions on the third level are related to the transfer of integrity onto higher levels which results into increasing importance of middle and large work micro-regions in the regional structure.

Nowadays it is possible to define the concept of micro-region in conjunction with regional development of municipal associations in order to develop by splitting the development incentives on wider group of regions, towns and villages. Micro-regions, i.e. rural micro-regional structures in the present concept can be understood as an association of municipalities in which municipalities act together, share a common agenda, purpose and united in their efforts to realize the micro-region development of the territory from various aspects (natural, cultural, social, socioeconomic, environmental, social aspects etc.). Micro-regions present the basic geographic units with common social economic-cultural and, importantly, environmental issues, which are able to create actual identical development program based on the use of local resources and innovative practices, the principles of partnership and cooperation. They are actually communities of municipalities (rural but also urban) and inceptions of essential administrative municipalities (*Spišiak*, 1999).

Geographic Background of the Micro-region of Červený Kameň (MČK)

The issue of sustainability of a rural landscape was applied in the micro-region of Červeny Kameň (MČK), which is located in the district of Pezinok, Bratislava region. Detailed research was carried out in years 2006 and 2007,

while after that period the micro-region was observed for some selected human-geographical specifics, for example specific forms of suburbanization, transportation, tourism, and local government.
This micro-region shows tendency of influence by the cities of Bratislava and Trnava in terms of suburbanization, but also shows a significant suburbanization impact of the neighbouring towns of Pezinok, Modra, which markedly affected their rural hinterland in the area of the studied MČK. This micro-region comprises 9 municipalities: Báhoň, Budmerice, Častá, Doľany, Dubová, Jablonec, Píla, Štefanová, Vištuk.

Basic information for fulfilling the essential requirements of sustainable development were acquired from a field survey of how local inhabitants perceive the area of municipalities. From historical point of view, this area is very unique as a major trade routes and royal routes passed through the area. One can consider the following villages as being the oldest in the area: Častá (1240, Rotenstein, Piberspruch, Vereskw), Báhoň (1244, Báhoň, Superior Bachan), Vištuk (1244, Vyscha, Wysta).

In terms of the municipal administration the territory belonged to the Bratislavská župa County. From physical-geographical point of view MČK is situated between two natural units – the mountains of Malé Karpaty and the lowland of Podunajská nížina. The Malé Karpaty Mountains extend to the territory in the northwest and the southeast is encompassed by agricultural Podunjaksá nížina, especially the part of the Trnavská pahorkatina hill-land. The municipalities of Doľany, Častá, Dubová partially comprise Malé Karpaty (north part) and Trnavská pahorkatina (south-east part). The cadastral territories of Štefanová, Budmerice, Vištuk, Jablonec, and Báhoň entirely comprise Trnavská pahorkatina. From the hydrological point of view, MČK is drained by the river of Váh, especially its right tributaries of Vištucký potok, Gidra, Štefanský potok. Soils in the region are fertile classified as brown soils. In the mountainous areas, the brown soils change into luvisols and cambisols developed on the slopes of Malé Karpaty. The climate in this area is warm and dry with mild winters.

Human-geographic research focused on the quality of life in the municipalities of the MČK

The content, quality and intensity of man's relationship to the territory in which it resides and lives, significantly influences his behavior and activity. If one has created a positive relation to areas of his or her life and work, it is expressed in the total spectrum of socially desirable off-work and work activities and it is reflected in a lower rate of potential migration.

In human-geographical analysis in the context of applications to the MČK project, we addressed several factors of the issue of life quality as it is indicative to measure the quality of human relationships with the environment in which he lives as this is a measure of the quality of human potential, which is very important in the context of sustainable development programs of the studied community. Man's relationship to his own village or to the landscape in which he lives, is a specific type of variable and can be examined only under the so-called "soft" data acquired by empirical research and observation.

The research was undertaken using questionnaire investigation for estimation of the complex view of particular village in which all representative groups of population were included. The choice of respondents was random at the beginning but in the further steps it became selective in order to comprise the structure of population (by gender, age, education, economic activity). There were 181 people questioned who were older than 18 years. The questionnaire comprised 154 questions in grouped in 20 blocks. The blocks created a comprehensive scope for a complex understanding of the economic, social, cultural, and last but not least, environmental levels in these communities. The research was carried out in all 9 municipalities. There were 25 people questioned in Báhoň, 32 in Budmerice, 33 in Častá, 24 in Doľany, 15 in Dubová, 14 in Jablonca, 8 in Píle, 7 in Štefanová, and 23 in Vištuku. There were 28 000 answers acquired in total, in which both quantitative and qualitative parameters were collected.

Individual responses will be quantified and dominant priorities will be identified for particular blocks of questions. Furthermore, we will look for correlations according to individual demographic groups. Geographic aspect will be addressed by identification of individual specifics of each municipality as well as their manifestation in cross-regional range. In particular, it appears that the population shows certain mobility, not only in the closest surroundings, but since the MČK has good transport location, penetration of the population into more distant locations and regions can be observed.

The questionnaire comprised detailed questions about the conditions and the quality of housing, coexistence and neighbourhood relations, health and social care, educational facilities, quality and range of services, opportunities for sport, recreation and other activities, cultural and social activities, conservation of cultural and historical sights, cultural and historical art and craft traditions, the possibilities of jobs in the village and its surroundings, public transport and security in the village. Further questions were focused on the participation of the village inhabitants in public life, the awareness of population activities taking place in the community, promoting community to enhance its attraction for visitors, the overall environmental quality and community development assumptions. Respondents to the questionnaire responded to the closed and open questions. The closed questions have the option "yes" or "no", and the option to assign a grade (from 1 to 5), which assessed their satisfaction (acceptance) or dissatisfaction (disagreement) with the area. The open issues have the possibility to freely articulate their views and ideas.

CASE STUDY OF THE ČASTÁ MUNICIPALITY

The municipality of Častá has a central position in the MČK and is the largest municipality in the micro-region. It is also the seat of the MČK regional association. The questionnaire was targeted to acquire large sample of the local population comprising all age groups and all economic groups in order to get a complex picture of the village. The village has a relatively low population growth over the period 1869-2001. The period after the WW II enjoyed steeper increase. The largest number of inhabitants was recorded in 1961 with 2261 inhabitants. After this period there was a slight increase. The population growth is specific for being the largest amongst the municipalities during 1880-2001 in the MČK. Just after 1991, there was a slight decline of population, when Budmerice recorded faster increase of population. Overall, during the monitoring period, the number of houses has increased by 374. Geographical location of the village is favourable, which is an important aspect of its development. Tme village lies below the main foothills of Malé Karpaty and significant route which is the Wine Route of Malé Karpaty. First class road passes through the village connecting Pezinok-Modra-Smolenice-Trstín which has a positive and decisive impetus to the village development for future. Moreover, this route connects to other second and third class roads within the municipal territory towards the direction Budmerice-Štefanová and direction Červený Kameň-Píla. Assessment of the responses collected during the questionnaire will be focused on the important aspects and alternative opinions which can give a comprehensive picture of life in the village and its surroundings.

Housing is now one of the decisive issues of municipality development. Older houses dominate in the village of Častá, which were built between 1946 and 1970, when there was also the greatest increase in the number of inhabitants. 45% of respondents live in older houses, other forms of housing such as renovated detached houses are also represented in a very high rate (33%) and their share is increasing every year thereafter. This relates mainly to a convenient transport location of the village, as some families commute from the surrounding towns. Further, the village has a certain nodal function and a certain quantity of existing and readily available services. In evaluating the benefits of housing, there were several alternatives offered in the questions.

In all of them, positive reactions dominated. Maximum of positive responses was recorded for the alternative of "ownership of the house, gardens, economy", where over 78% of respondents were very satisfied and satisfied (agree or fully agree), respectively. The alternative of "the life here is more peaceful" was addressed by 96% of respondents who were also very satisfied and satisfied (agree or fully agree). In order to capture opinions on the disadvantages of housing in the village, there were four alternatives provided to the respondents. Most respondents were disappointed about lack of jobs in the village – 36% of surveyed respondents. About 46% of the surveyed inhabitants share opinion that the village offer few opportunities for self-realization. Slightly more than a half of the respondents disagreed with the statement (50% -53%) that there are few opportunities for shopping and use of services and that one needs to commute elsewhere in order to access them. In general, people are satisfied with housing in the village of Častá they do not mind with some disadvantages. Housing is closely related to **mutual relationships with neighbours**. More than 61% of respondents say that friendly relations with good relatives or friendly confidential relations dominate in the village (over 15%). Good co-operation without any special personal relationship is between 24% of surveyed respondents. No negative negative alternatives on neighbourly relations were recorded in the questionnaire.

Health care is, in general, on a good level as the respondents are satisfied or very satisfied. There is overall high satisfaction with health care for youth (51% of responses) and health care for adults (45%). Positive reactions on the quality of health care and related services are very likely due to recently refurbished health care centre where qualified pharmacists and medicine doctors work. In terms of social care, a relatively high satisfaction (51%) or even very high satisfaction (33%) was recorded (graph CAS6). The village has a centre for social care which provides nursing care for elderly people. In general, people are satisfied with the work of the municipal administration staff including the mayor. However, they miss more services for elderly people who would like to meet more often on a communal basis. Regarding the education services, respondents seem to be satisfied. There is one primary school and a kindergarten in the village. While 54 % of respondents were satisfied with the kindergarten fewer shared the same opinion on the school (39%). Overall, positive feedback on the level of school services was recorded and several suggestions for improving the education were outlined.

Trade and services in the municipality was addressed by 15 major alternatives. Respondents expressed great satisfaction and satisfaction with the quality and range of foods (75% - 24%) and drugstore (42% - 57%). They are also satisfied with the quality and assortment of manufactured goods (60% of respondents), with the services of local marketplace, while dissatisfied with the quality and range of footwear and textiles (30% of respondents). The village lacks carpentry and glaziers, information centre, shoe repair, footwear and textiles. There are the following business facilities in the village: the street of J. Holček - building, buying pallets, cargo transportation, purchase of secondary raw materials, paints and coatings service, grocery, bar, pack-house, pub, the Jabloňová Street - gas station, street of Cpt. Raša - post office, women's and men's hair salon, canteen, hardware and key-maker, grocery, cheap clothes, the Modranská Street - gardening centre, the square of R. Fábry - restaurant, grocery, canteen, the non-government health center with dental clinic, gynecology clinic, a pharmacy, a doctor for children and adolescents; the Podhájska street – selling and servicing vehicles on the Revolučná Street - florist. Improvement of services, competitiveness and quality of service in the village requires more restaurants, more choice of assortment in the existing businesses and improved professional behaviour of the shop-assistants in stores. Great satisfaction and satisfaction was expressed as traditionally with the mail services on the car repair shop, hair-dresser and barbers, tailoring and carpentry. On the other hand, dissatisfaction exists with the water supply services, and electronics, locksmith (Figure CAS9). The inhabitants proposed improvement of information labelling for visitors, info centre, build guesthouses, restaurants, code of conduct of the service staff, extend the opening hours, lower prices and offer greater choice of goods and services.

The quality of life is also expressed in accessibility of **sport and recreational activities**. The greatest satisfaction occurs with the level of football, hiking and cycling. The biggest disappointment and dissatisfaction among respondents was expressed with opportunities for tennis, volleyball and water sports. The village runs a karate course, cynology course, shooting course and a voluntary fire brigade. Village offers opportunities for cross-country skiing – the Častovská päťdesiatka event, opportunities for hiking, cycling and powerlifting. The locals would appreciate tennis courts, playgrounds, better and new hiking trails, swimming pool, and better service of rural tourism. They are satisfied with activities of the Malokarpatská Wine Route, with options for wine and agro-tourism, services at the Červený Kameň Castle, with the theatre activities, with the opportunities for fishing and hiking. The other leisure activities of interest comprise development of tourism and agro-tourism, viticulture and wine making, theatre shows, shooting and cynology. The greatest attractors of the village are seen in hiking, the Červený Kameň Castle, horse farm, rural tourism, wine, cycling, various interest groups, theatre and folk art performances, Častovská päťdesiatka cross-country ski run, shooting and fishing. Several proposals for improvement of the services for the visitors were outlined - to build new and improve existing playgrounds for children, to promote rural tourism, promoting theatrical performances and youth clubs and language training for local people.

The village organizes several **cultural and social events** throughout the year. The castle of Červený Kameň is the dominance of the village and it attracts visitors with various attractions and related events during the year and regularly. Attractive events include traditional erection of May trees, children's fairs and feasts, theatre events, Červenokamenská pilgrimage, Častovská "50-ka" – cross-country skiing trail, knight days, Mrenica, bonfire and more. Cultural and historical monuments of the village comprise the already mentioned Červeny Kameň Castle, the Pillar of shame, Fuger’s house, church, chapel, Holy Trinity a statue, Memorial of Juraj Fándly. Respondents expressed the need to increase the level and quality of cultural and social activities such as establishing a cultural centre, expansion and improvement of services, establishment of a cinema club for young people, greater involvement of citizens in the communal actions, etc.

Business opportunities satisfy about 54% of respondents, while 30% of respondents are satisfied and also dissatisfied with jobs in the village. There is considerable interest in working in tourism and agro-tourism (28% of respondents), followed by trade and services (20% of respondents) and construction (13% of respondents). The interviewed respondents expressed the need to develop better infrastructure and economic conditions for the emergence of new firms, construction pensions, construction of new residential houses, shops, a new entertainment parks, creating more jobs and providing tools for wider promotion and fulfilment of citizens in the municipality and in the region.

Public transport largely satisfies or very satisfies the population (48% and 42% responses respectively). This concerns the direction towards Modra and Pezinok. Most people are dissatisfied with transport towards Trnava and into the surrounding villages. Generally, there is only a slight satisfaction level on quality of public transport. The questioned people regard the **safety** in the village more as satisfactory (24% -48%) than dissatisfactory (6%). Also, more people are satisfied with the level of crime (18% -36%) than dissatisfied (6%). Safety in the municipality could be improved by establishing municipal police which was proposed by up 58% of respondents and 17% of respondents ask for improved lighting.

Public life in the village enjoys o good level of satisfaction by the respondents who are predominantly gently satisfied (45%) and fewer are very satisfied (24%) with public activities. There are only 3% who feel dissatisfied. According to the responses, public life in the village is mostly determined by community organizations (63%) which activities generally satisfy the people's needs. The church runs its activity on a neutral level of satisfaction by 45% of respondents - neither dissatisfaction nor satisfaction, 18% of respondents feels very dissatisfied with the work of local church. The work of local authority is generally appreciated by the residents and 45% of them are very satisfied and while 42% are satisfied. No one was dissatisfied. Traditionally, strong dissatisfaction and discontent is expressed regarding the work of political parties in favour of citizens (24 %–21 %). Regarding satisfaction with the work of members of the municipal assembly and the mayor, the respondents rated their as positive rather than negative. Residents are more satisfied (39 %–21%) to very satisfied (21 %–15 %) with the work of mayor as oppose to the work of the members of communal assembly. **General awareness** of the local population appears to be high. The residents feel informed by the local authority, 45 % are satisfied to very satisfied. Regarding the information on cultural, sport, social and recreational activities residents feel rather satisfied (33 %–57 %) to very satisfied (2 7%–48 %).

Environment knows people very well, 63% of respondents know well and 27% of respondents know very well. The nicest part of town is considered a park at the pump, Cerveny Kamen Castle and its surroundings, memorial J. Fándlyho, village square, local authorities and the surrounding area, the cemetery area of hills and Hošták, forest - foothill area of the village. Častanské the worst dump in the beginning of the village, around the main road and the entire main road, residential buildings and their surroundings, Sokol street. In relation to the environment should be particularly reclaim public spaces of public green areas, maintain cleanliness and increase opportunities for recreational and sporting activities. The village still use the funded projects and grants for rehabilitation and reconstruction of sidewalks, schools and the main street, co-finance the implementation of water supply and creating a nature trail and build a dwelling house.

Environment is very well known to people, 63% of respondents stated it is well-known for them and 27% of respondents know it very well. The following sights are considered the most beautiful parts of the village: green park at the petrol station, the Červený Kameň Castle and its surroundings, memorial of Juraj Fándly, the square, local authority building and the surrounding area, the cemetery area, hills of Vŕšok and Hoštáky, forest - foothill area of the village. The worst parts of the village include: the dump of the Častá village in the beginning of the village, the surroundings of the main road and the entire main road, residential buildings and their surroundings, Sokolská street. In relation to the improvement of the environment, it should be particularly focused on development of public spaces, green areas, maintenance of cleanliness and increased opportunities for recreational and sporting activities. The municipality has exploited the funded projects and grants for rehabilitation and reconstruction of sidewalks, schools and the main street. Further, the grants were used in co-financing the implementation of water supply and creating a nature trail and build a dwelling house.

THE MICROREGION OF ČERVENÝ KAMEŇ – SYNTHESIS

It is important to stress that the overall assessment of the survey among public provides a comprehensive view of the MČK. Majority of the responses were of a local character. Often, these provide basis for synthesis of local perception, they can be mapped providing a certain image of the "individuals", meaning the municipalities which can prepare any serious project concerning the development of the micro-region. Regarding the **housing**, the old family house is the most frequent type of accommodation for residents, but living in a renovated house or in a new house is becoming more frequent. The biggest advantage of living in the countryside is the quite and peace of the environment. To what extent this will be perceived in the future is determined by the influx of new inhabitants into the MČK, which is inevitable, since the area has a favourable geographical location and good physical-geographical, but also the human potential. The disadvantages of living in the MČK count classical forms, which are common in other rural regions. These encompass lack of jobs in some developed municipalities the poorer self-realization of the residents. These are all ideas for the government to pursue activity in order to satisfy the needs. Generally, good-neighbourly **relations** exist among people in the countryside. This was confirmed in the MČK as a whole, where only 2% of respondents had the impression that in arguments are frequent and cooperation between citizens is impossible.

Another problem to be addressed in the area is the **health care** for all populations. In some villages, especially in the larger ones, there is a general practician doctors established, but it turns out that this is not enough and often there are objections to their work. There is a greater internal discontent regarding health care for the adults, as younger generations are often provided health care services at school or at work, which is outside their residence. Health care is partly related to **social work** with which the inhabitants are slightly higher than satisfied than with the health care. The social work treatment has not yet concerned larger population groups as the locals help themselves. To keep the younger people in the MČK, it is important to maintain the level of **education**, which relatively satisfies the needs. However, there is still some dissatisfaction with the level of education at second level of primary schools. Primary schools also achieved some success in competitions such as the school in Vištuk or in Budmerice, which to some extent motivates the younger teaching staff absenting in the MČK.

Trade and services belong to the important factors of rural development. The residents expressed relative satisfaction with the local retail, especially with groceries and drugstores. People seem to be mostly disappointed with footwear stores, textiles and industrial goods stores. It would be beneficial to locate building goods store in the MČK because of rapid construction in the suburban zone Bratislava. Regarding the services, there is a slightly larger dissatisfaction as oppose to retail structure. The post office services (88 %) enjoys the greatest satisfaction while the biggest disappointment is with the glaziers (67 %), the electronics services (52 %) and the locksmith (52 %).

In general, football belongs to the most important **sport activities** run in a rural environment. The MČK is no exception, although gradually other sports such as cycling and hiking are becoming more popular, especially in villages in the Malé Karpaty Mountains. Some dissatisfaction exists with water sport, which lacks swimming pool or lakes in this region. Hence, building an artificial lake or a pool would be beneficial for the region.

Business in the countryside is slowly converging, but the region still has not a strong position. This is reflected in a quite strong dissatisfaction of people with employment in villages or by entrepreneurs. Proposals made by the respondents for establishing new industries in the MČK comprised trade and services (25 %), followed by tourism and rural tourism (20 %). The contact with the surrounding area is via **transport systems**. This area is dominated by road transport. Railway affects only the peripheral parts. The transport system dissatisfies the people as is a small number of connections and apart from the main rush hour time it is difficult to get as near as the rural municipality or town. The best transport access exists in the villages situated at crossroads and in the peripheral villages. Improvements of the transportation require willingness of the supra-regional authorities.

The rural landscape is generally considered **safe** from different perspectives, but the area often serves as transitional, therefore it is possible to expect some negative effects. This was not confirmed in the survey. The population feels secure enough, while rural communities have to guard their safety through self-regulatory means. Most of the respondents suggested founding municipal police (34%), but most municipalities cannot afford this due to low budget.

If the countryside demands for an efficient and economic-ecological functioning, it is necessary to involve **local people in its management**. This involvement is weak so far. People tend to rather passively perceive what is happening in the village and they get involved only in the traditional activities associated with cultural and social focus. The activities in the MČK are supported by major organizations. Perhaps the local authority enjoys the higher credit among population, but it is also mandatory for any local government. The church has maintained a certain standard of satisfying people's needs. People are very dissatisfied with the work of political groupings. This activity is closely related to the satisfaction with the municipality and its mayor. Overall, there are is satisfaction (31% satisfied or very satisfied, 40% dissatisfied or very dissatisfied). So the mayor enjoys relatively greater satisfaction than the members of local assembly (36% satisfied or very satisfied, 29% dissatisfied or very dissatisfied). Awareness of what is happening in villages the MČK is good. People feel that it is worse with respect to the visitors of the worse for the visitors of the MČK.

It seems that people know strengths and weaknesses of their **environment**. People consider both cultural and historical but also current artefacts (churches, castles, mansions, building material, aesthetic works), but also natural peculiarities (local woods, around the middle of the village) as the strongest attractors of their landscape. This proves that rural population has begun to realize the quality of rural environment and wants to stay in it, wishes to live in it, conduct business and relax in it.

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Humánno-geografický výskum v mikroregióne Červený Kameň

Výskum kultúrnej krajiny, do ktorej vidieckej krajina nepochybne patrí, si vyžaduje permanentné sledovanie či už fyzicko-geografických alebo humánno-geografických prvkov krajinnej sféry. Zmena kultúrnej krajiny z hľadiska fyzicko-geografickej je síce časovo neporovnateľné dlhšia ako zmena humánno-geografická. Ak sa v dostatočnom predstihu nepostrehne čo len malý náznak zmien niektorej zo zložiek fyzicko-geografickej sféry, môže dôjsť k výraznému poškodeniu kultúrnej krajiny. V predloženom príspevku sme sledovali humánno-geografický výskum vo vidieckom mikroregióne Červený Kameň, ktorí sa nachádza na styku pohoria Malé Karpaty a Podunajskej nížiny so zámerom zachytiť nosné prvky kvality života. Nakoľko v júni 2011 postihli značnú časť tohto mikroregiónu katastrofické záplavy, tento fakt miestne obyvateľstvo pri výskume nejako nebralo do úvahy, ak áno, tak len sporadicky. Hľadajú sa príčiny, ktoré to spôsobili, resp. ako sa mohlo tomu zabrániť. Je nevyhnutné pri koncipovaní výskumného programu takéhoto typu zakomponovať aj dlhodobé sledovanie zložiek fyzicko-eografickej krajinnej sféry v kontexte globálneho charakteru.

TRAFFIC SERVICE IN SOUTH MORAVIAN REGION IN THE CONTEXT OF THE USE OF GEOGRAPHIC OUTCOMES IN PRACTICE

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Abstract: *Transportation, respectively transport services are essential factors for the development of a territory. The present contribution analyzes the transport services in*

South Moravian Region, up to the level of municipalities. It also identifies specific factors that have essential impact in the region on creating the final shape of public transport. On the one hand contribution verifies the effect of generally expected factors (population size of municipalities, transport infrastructure, development of an integrated transport system, major employers, etc.), on the other hand, it also provides space for the evaluation of specific conditions. Subsequently, it compares the findings obtained with the South Moravian Region documents and documents from other institutions that are dedicated to the issue of public transport, or they deal with them in some way .

Key words: *Traffic Service, South Moravian Region, Documents about regional development*

INTRODUCTION AND THEORETICAL BACKGROUND

Study of public transport belongs to some of the basic components of Transport Geography. State of transport services is together with the technical state of transport infrastructure decisive catalyst that allows interaction and complementarity among regions.

Approaches to the study of transport services vary by sector of study. As representative geographical approaches investigating the spatial differentiation of municipalities according to their serviceability, let us mention at least Marada (2010) and Seidenglanz (2007). The second approach represents traffic engineering sciences (eg Jacura, 2010), dealing with rather technical parameters of transport systems. Definition of transport services varies. In our research is essential the legislative framework of the concept defined by the Act No. 194/2010 Coll, which describes the provision of basic municipal transport services in CR by public transport (ie, basic daily needs).

Transport service is currently a hot topic that affects the general public. After taking over of this issue by regional offices occurred quite significant changes in the financing and organization of public transport. Geographers are studying transport services since 60 years. Eg. Hůrský (1969) and Řehák (1994). Natural topic of georaphical works is the area connecting the issue of peripheral rural areas with worsen transport accessibility. Theme of transport services, especially in rural areas, engaged Zapletalová (1998), along with Marada and Květoň (2006), Seidenglanz (2007) and Borut and Ivan (2010). The results evaluate often restriction of connections during the transition period (ie after 1990) and their loss especially in the evenings and weekends (see eg Seidenglanz 2007a, and Marada and Květoň 2008). Analysis of the transport service is a bit more complex and more plastic, because decreases of connections were even not blanket in the 90 years (as illustrated in his work Seidenglanz 2001 by the example of the newly created district Jeseník). After year 2000 is more appropriate to speak about stabilization of public transport services, instead of limiting the supply (Marada and Květoň 2010). In this context we should mention the creation of integrated transport systems, which often lead even to improvements in the standard transport services, not just on weekdays but on weekends (eg, South Moravian ITS, ITS in Prague and its surroundings, etc., Hladik 2007). Among foreign authors dealing with the issue of transport services, let us mention at least Nutley (1998) and Horňák, Hurbánek, Michniaka et al. (2008).

Studies dealing with traffic and its impacts in the area must take into account not only the theoretical view (eg graph theory), but also geographical approach. Hampls works are the most important foundation in this area (eg, Hampl 2005). As we shall see in our paper, the essential element is the interaction of the character of settlements with transport services. Marada (2010) and Kraft (2009) directly combines the study of transport in relation to the geographical organization of society. As an example of case study we can mention at least Jansa (2004). Another approach can then be daily rhythms assessment in relation to transport services and the relationship to an integrated transport system (Hladik, 2007). (Seidenglanz 2010) study also the impact of quality serviceability of setllements in comparison to available jobs and related plurality of election.

ANALYSIS OF TRANSPORT LINKS

For the purpose of evaluating the spatial reality of transport services in the South Moravian Region was used database of CHAPS, s.r.o. (in the task of CDV, v.v.i. for the Ministry of Transport, 1F81C/073/190) Data were available to the level of individual municipalities. Serviceability of municipalities was observed by using key indicators as the number of connections, average commuting time and the first arrival and last departure to/from the center. These links were then analyzed in terms of availability of the regional city (Brno) and the municipalities with extended powers (MEP). Serviceability was also considered as a weekday (Tuesday, the 20th 4, 2010) and weekend (Saturday, the 17th 4, 2010). Qualitative categories were determined on the basis of values of parameters entering into the histogram, which could then be scored and then aggregated. Such aggregated categories represent the level of community transport services in the spatial scale (see Fig. 1 and 2)

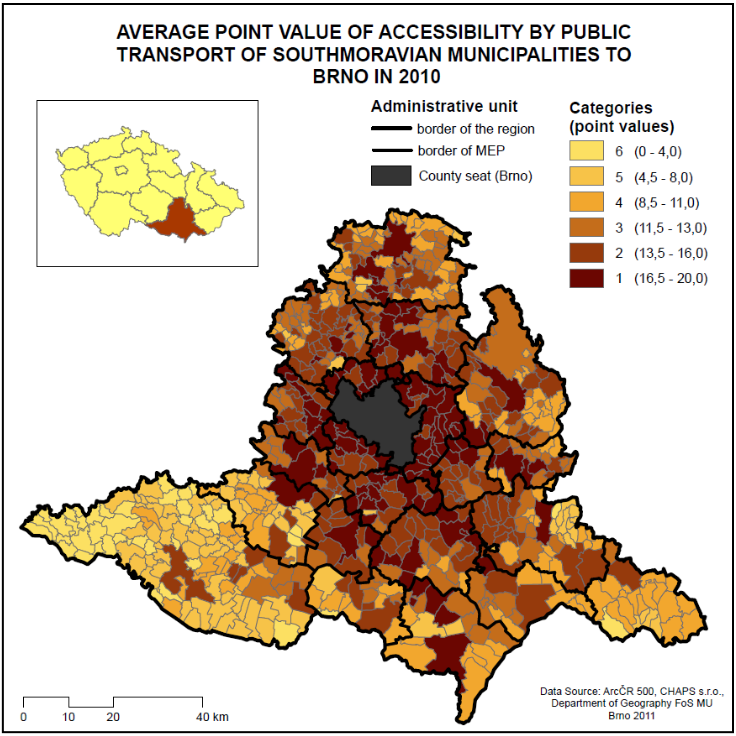

Fig. 1: Aggregate point value of transport serviceability from an average municipality in South Moravian Region to the county seat Brno in 2010 (category 1 = best transport services)

Municipal transport services and their access to the regional city of Brno differ distictively in dependence of distance from the center. Also here we can pronounce natural fact that with increasing distance from center also sinks the level of serviceability. At the same time, however, there are significant distortions from the current situation, since the analyzed days was not yet implemented the extension of an integrated transport system of South Moravian Region (ITS SMR) in Znojmo (1 7th, 2010). This system is a key factor influencing fundamentally distribution of transport services. The rate of enlargement and intensification of the ITS SMR forms the whole space of the region. His influence interfere not only in the situation of transport services, but in the whole complex of related socio-economic development potentials and living conditions.

From Fig. 1 is obvious that the aggregate point value of accessibility by public transport of average municipalty in South Moravian Region (SMR) to the regional center of Brno continuously decreases towards the center. The darkest areas directly surround the city, which indicates very strong ties, which indicates exceptional quality transport services. The shape of the SMR helps to reach this level of serviceability to the very border of the region, especially in the case of MEP Tisnov, Rosice, Ivančice or Bučovice.

In the areas of lighter tones we find transition zone with an average serviceability - here are the border areas from the north to the east and MEP Kyjov, Hodonin, Breclav, Mikulov and Moravský Krumlov. These areas are characterized by considerable internal imbalance values. It is caused by more central planning of the traffic system in remote areas, it means better access to local major towns, with north-south distance difference.

We can consider especially the district of Znojmo and MEP Veselí nad Moravou as under-served communities. Another problematic area also will include the already mentioned MEP transitional zone, especially Moravský Krumlov. Specific position occupies district of Municipality with local authorities (MLA) Vranov nad Dyjí, where municipalities shows almost any visible level of serviceability. In the case of Znojmo is necessary to deliver the above-mentioned fact that our listed status has been partially remedied by the introduction of the ITS SMR.

An interesting fact arises from the blending Fig. 1 to the real situation of SMR distribution transport network. Traces are especially pronounced at larger distances from Brno. It´s possible to recognize dark traces indicating a better transport services in places where are going through rail corridors towards Břeclav or Česká Třebová, but also tracks in direction to Olomouc, Kyjov or Moravské Budějovice. They are intensively used ITS SMR.

Transport service is not only measured by the availability of connections to regional city. In Fig. 2 is shown the situation from the viewpoint of MEP serviceability. In this view is reflected mainly the impact of Brno, which in its immediate hinterland usurps connectivity to appropriate MEP. This state of affairs indeed replicates reality of substitutions services and their availability in the regional capital. Weaker binding of transport services are also observed in the district MEP Znojmo. Here are caused mainly by large landscape of the district and the associated lower availability of its center. Conversely most strongly interconnected communities by public transport are located in the southeast part of the region.

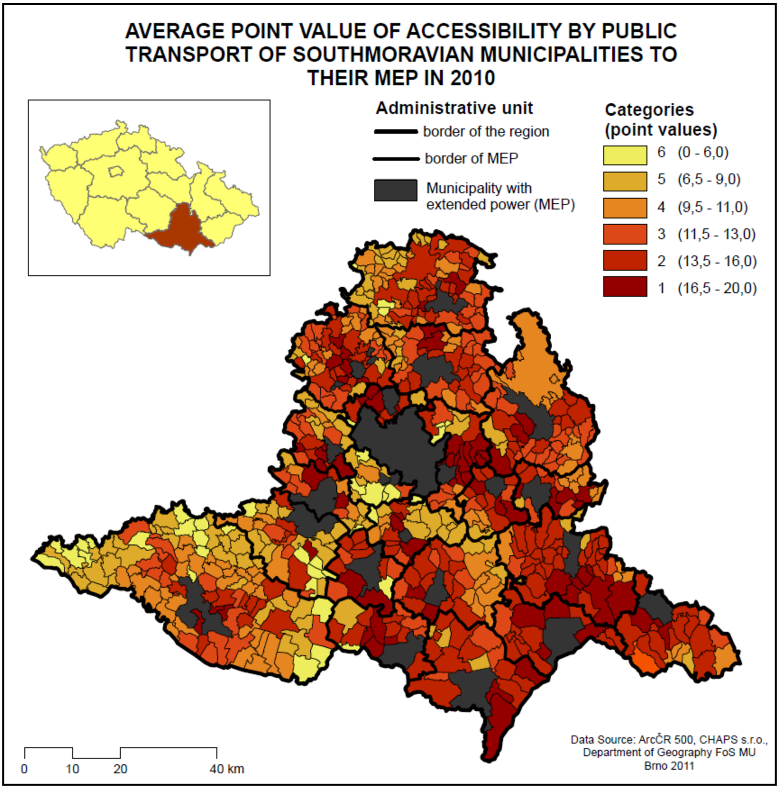

Fig. 2: Aggregate point value of transport serviceability from an average municipality of MEP belonging to the South Moravian Region to MEP in 2010 (category 1 = best transport services)

TRANSPORT SERVICEABILITY IN RELEVANT DOCUMENTS

The fundamental conceptual documents of South Moravian Region are definitely Regional Development Programme (currently for the period 2010 to 2013). Even its analytical mentions Brno as the most important commuting center and points to the fact that there is an increasing number of workers coming from more distant areas due to good transport services. In other words, we can tell on the base of this material that South Moravian Region has a dense network of communication which is comparable with developed regions in Western Europe.

To public transport is devoted just one subchapter throughout the analytical part. Preserving the existing level of public transport is there considered as essential, especially through integrated transport system (ITS SMR). In proposal part follows generally defined goal to improve public services. SMR wants to achieve it through optimization of an integrated transport system, including interconnection with neighboring countries. Attention is also focused on the preparation and implementation of transfer terminals. Other proposals include building a reported car parks and a system of "Bike and Ride", the introduction of electronic handling of passengers and rebuilding of railway junction in Brno.

Strategy of development of South Moravian Region build transport serviceability primarily on ITS SMR. In addition to its unquestionable economic benefit also points to its potential risks. These include impaired transport availability and accessibility of remote and economically weaker parts of the region (in this context are mentioned districts MLA Vranov nad Dyjí and Velká nad Veličkou). The strategy also refers to greater environmental focus by involving major railroads. Even by its nature is it rather a general document compare to the Regional Development Programme, which has determined the main directions of development, but not detailed. Therefore we can find rather more general expression in the proposal part of Strategy. On the one hand is ranked among strenghts good transport accessibility and serviceability of Brno and other municipalities in the region bordering on major transport routes. On the other hand, this document reflects poor transport services in peripheral areas of the county (at the district level are referred Vyskov and Znojmo).

Strategic and development documents of municipalities with extended powers in the South Moravian Region are focus almost exclusively within its administrative district. Equally they render formation of the concept of serviceability to higher self-governing units. MEP basically deal with own transport availability and accessibility of their facilities. They solve the issue of transport services in the region indirectly. Except perhaps is for South

Moravia-specific (and most elaborated CR) an integrated transport system. Question of connection to the regional center is rather included by specific municipalities as well as support for other modes of transport and improving the condition of some roads.

CONCLUSION

Transport serviceability of South Moravian Region is fundamentally dependent on the development of an integrated transport system of South Moravian Region (ITS SMR). This fact is evident from the analysis of complex relations shaped by public transport, which was based on data from 2010. Serviceability of by connections to the regional center is shaped strictly concentrically. The worst served districts are Znojmo and surrounding region of Veselí nad Moravou, which are also in farthest position to Brno. Exactly such a development is in line with the strategies of KORDIS, operator of ITS SMR. This is demonstrated by the current expansion of this system in the region with the worst public transportation - Znojmo (in 2010).

Strategic documents of SMR describe the reality of the general traffic situation in the region, and especially emphasize the pivotal role of ITS SMR. Spatial targeting corresponds with the findings of the analysis described above (Municipalities with local authorities (MLA) Vranov nad Dyjí and Velká nad Veličkou, district Znojmo etc.).

Detailed spatial distribution of transport networking follows from analysis of municipal public transport services from MEP. There are obvious competitive tendencies of individual centers, especially with the city of Brno. Obvious is also economic power of MEP given by the presence of big employers and number of jobs. At the level of MEP is, however, all strategic planning of traffic services render to the hierarchical higher entities (Regional Office of South Moravian Region, KORDIS).

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Dopravní obslužnost Jihomoravského kraje v kontextu využití geografických výstupů v praxi

Doprava, resp. dopravní obslužnost patří mezi základní faktory rozvoje určitého území. Předkládaný příspěvek analyzuje dopravní obslužnost v Jihomoravském kraji, a to až do úrovně obcí. Zároveň identifikuje konkrétní činitele, které mají v tomto regionu zásadní vliv na vytváření výsledné podoby dopravní obslužnosti. Na jedné straně tak ověřuje působení obecně očekávaných faktorů (populační velikost obcí, dopravní infrastruktura, rozvoj integrovaného dopravního systému, významní zaměstnavatelé atd.), na druhé straně však poskytuje i prostor pro ohodnocení specifických podmínek. Následně pak komparuje získané poznatky s dokumenty Jihomoravského kraje a dalších institucí, které se problematice dopravní obslužnosti věnují, či je v nich nějakým způsobem řešena.

ATTENDANCE REGIONS OF PUBLIC UNIVERSITIES STUDENTS IN THE GROUP OF HUMANITIES, NATURAL AND GENERAL EDUCATION SCIENCE IN SLOVAKIA IN THE ACADEMIC YEAR 2010/11

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Abstract: *The aim of this paper is to analyze a selected group of public universities in Slovakia in relation to the residents of internal and external students in the 2010/2011 academic year. Some identified trends based on the authors'previous research suggest that Slovak public universities and their education system is becoming more equal. The proportion of students at universities with a nationwide impact was reduced. The paper focuses on the specifics of the faculties group: the philosophical, theological, educational, artistic, natural and other social sciences. Relationships to the assessment of universities and faculties by ARRA agency are analyzed.*

Key words: *public universities, internal and external students, Slovakia, humanities, natural and general education science, ARRA agency.*

INTRODUCTION AND METHODOLOGY

Our team recently focused on higher education issues from a geographical aspect (Gurňák, Križan, Lauko 2009; Gurňák, Križan, Lauko 2010; Lauko, Gurňák, Križan, 2010; Gurňák, Lauko, Križan, 2010).This topic is discussed often in the media and also in the academic fields, and one of the themes of discussion is the quality of higher education.

The Academic Ranking and Rating Agency (ARRA) has contributed to this debate in recent years. Its annual evaluation reports summarize the assessment of public universities and colleges in Slovakia. This evaluation includes a wide range of parameters, including the number of students, the ratio of external and internal students, the number of teachers and scientific publications. These parameters are summarized in the scoring of individual faculties of the universities and colleges as a whole. Although the University faculties are classified into 11 groups, the only faculties compared are those which share similar interests and similar work conditions (ARRA 2010). This evaluation report used data from the Ministry of Education, Science, Research and Sport of the Slovak Republic and also the Web of Knowledge database.

Based on our previous research focused on the allocation of attendance regions of dominant public universities founded on internal data of the Ministry of Education, Science, Research and Sport of Slovak Republic, we decided to also apply our procedures to high schools according to their different focuses. To achieve this, we utilized the ARRA division of 11 groups, and this allowed us to compare the quality of individual schools on an extension of the dominant attendance regions.

Due to limited paper space we divided the total 11 groups into two parts. In this paper we cover the following six: philosophical sciences, other social sciences (not included in other groups), educational sciences, natural sciences, theological schools and schools with an arts focus. We evaluated the schools as individual universities, with faculties included in groups based on the ARRA report (ARRA 2010). We evaluated separately those students enrolled in internal or external forms of Bachelor and Masters study during the 2010/2011 academic year.

MAJOR RESEARCH RESULTS

We defined the dominant regions of school attendance regions, in relationship to both internal and external study, for each group of public high schools. Limited space precludes the description of this issue in detail, so therefore we have summarized this theme in a series of maps.

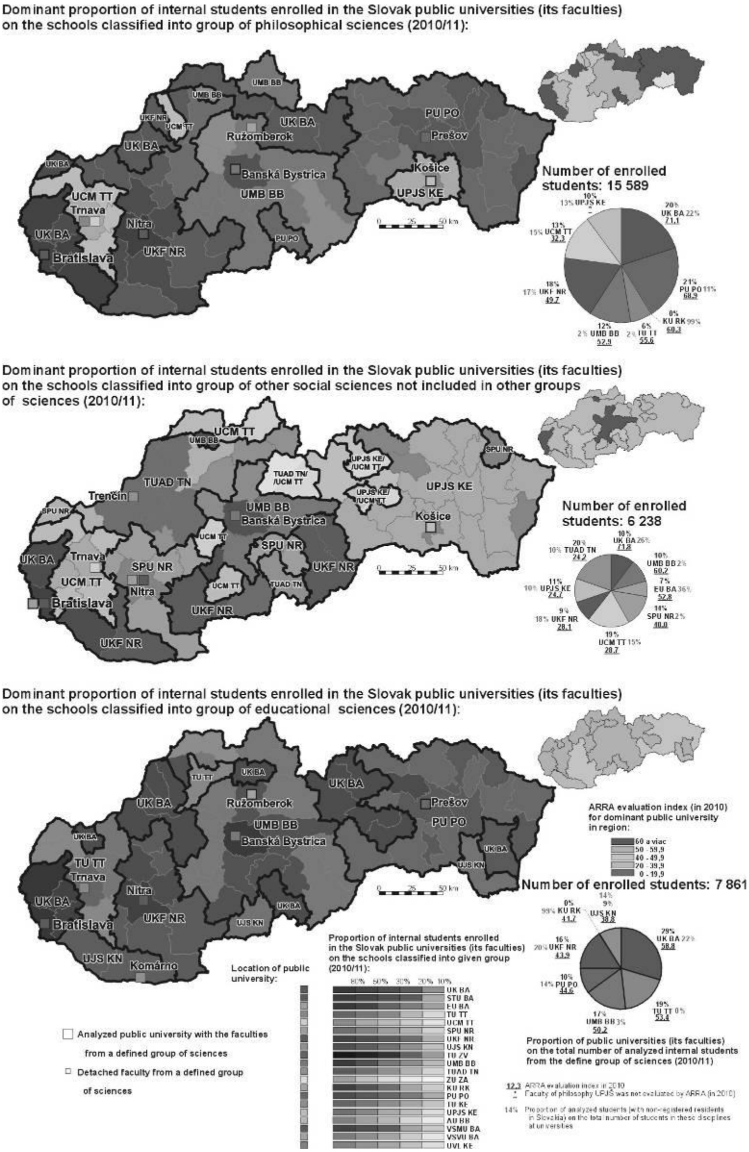

Fig. 1: Dominant attendance regions of internal students enrolled at public universities in Slovakia during the 2010/2011 academic year: classified into philosophical, educational and other social sciences groups.

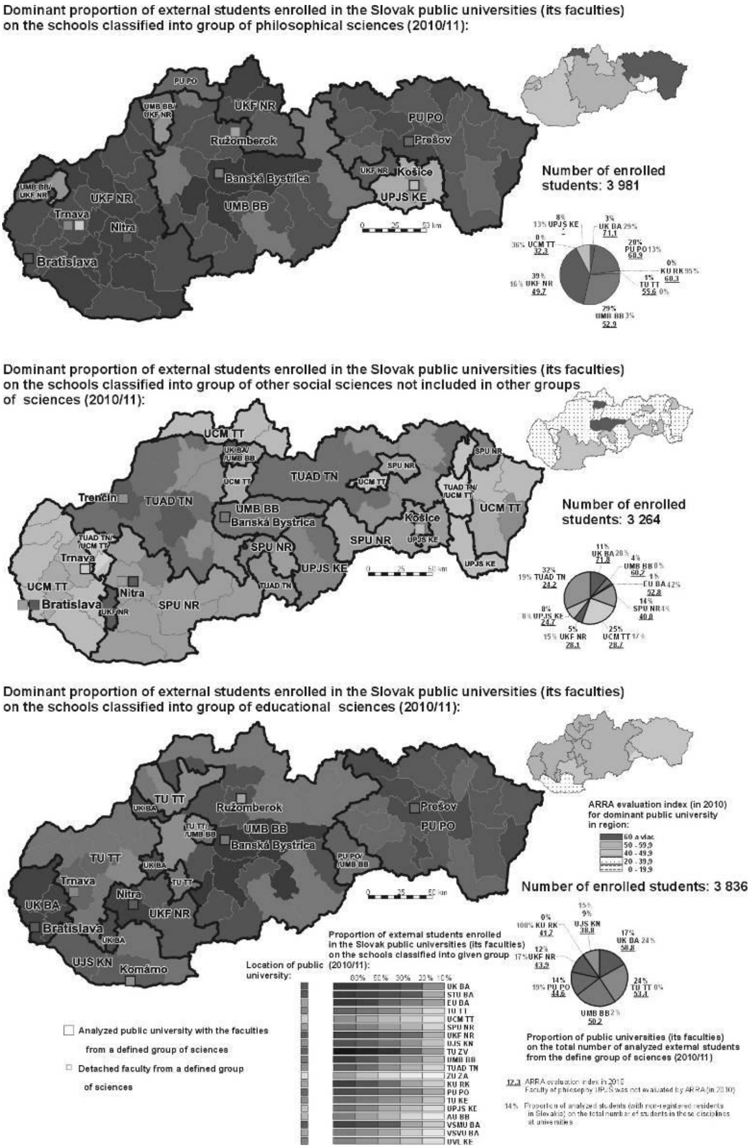

Fig. 2: Dominant attendance regions of external students enrolled at public universities in Slovakia during the 2010/2011 academic year: classified into philosophical, educational and other social sciences groups.

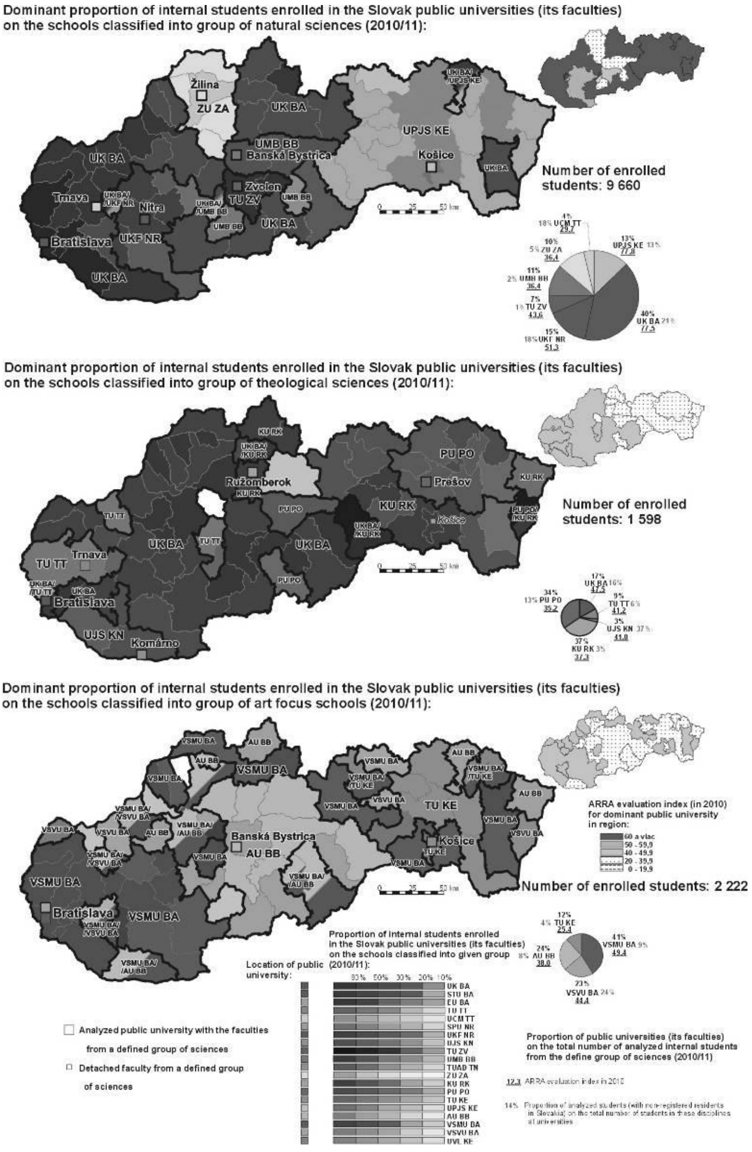

Fig. 3: Dominant attendance regions of internal students enrolled at public universities in Slovakia during the 2010/2011 academic year: classified into groups of natural and theological science, and schools with an art focus.

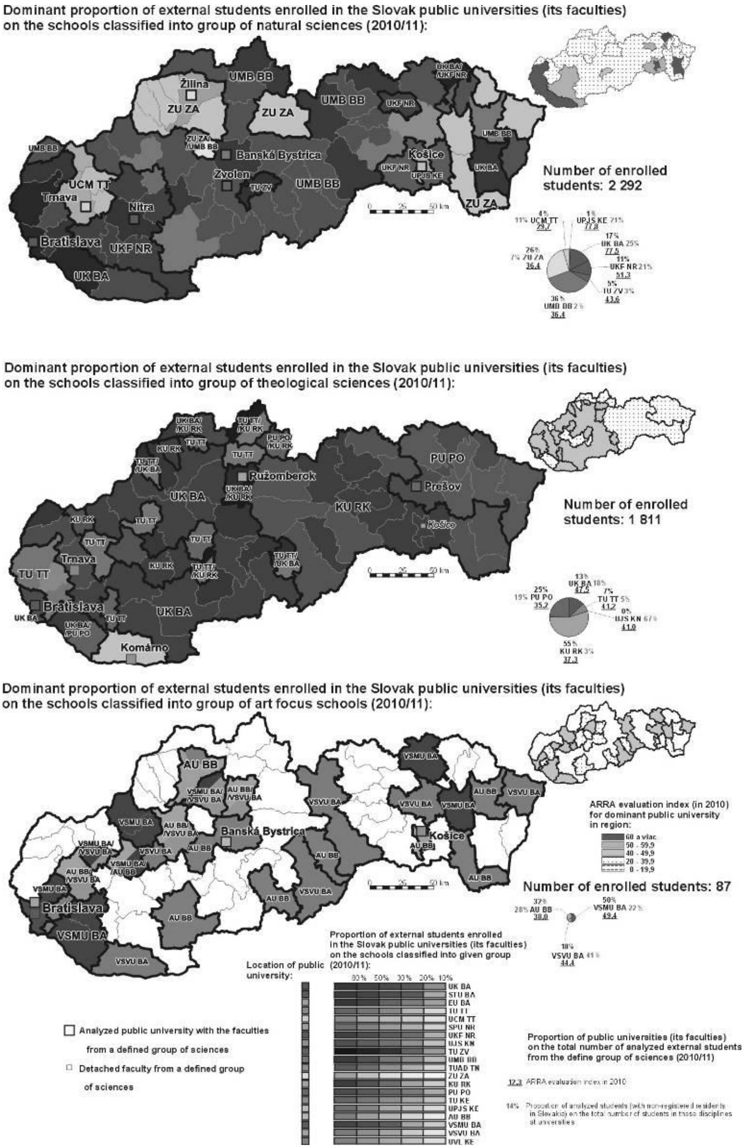

Fig. 4: Dominant attendance regions of external students enrolled at public universities in Slovakia during the 2010/2011 academic year: classified into groups of natural and theological science, and schools with an art focus.

In principle, we can conclude that there are very significant differences in the distribution of attendance region by individual group of high schools and their parts, and often even within one university. For example Comenius University in Bratislava has very different dominant attendance regions for each of its 13 faculyies. Regarding the completeness of the data, we used all available data provided by schools to the Ministry of Education, Science, Research and Sport of the Slovak Republic. We included students whose residence is associated with a specific municipality in Slovakia within our analysis. With regard to the existence of students residing outside Slovak territory, the proportion of these students in some of the high schools is extremely high This especially applies to the Catholic University in Ružomberok which does not specify this data for 95 to 98% of their students in their Faculty of Education and Philosophy. This proportion is quantified by red numbers in the graphs.

As we expected, there are very significant differences in the distribution of the dominant attendance regions among internal and external students. We have endeavoured to relate the distribution of the dominant attendance regions to the assessment of individual universities in accordance with the ARRA agency, as depicted on the small additional maps. Using this methodology, comparisons between groups of high schools would be incorrect, but when we compare schools ranked by ARRA agency with the dominant high schools attendance region, there are often significant differences between internal and external study. Results show that the external study form dominates the internal form at lower ranked universities. An example of this is observrd in the science study group.

CONCLUSION

Despite the different circumstances in different groups of high schools, the results show that there is no dominant school with a nationwide impact. To the contrary, many schools have a regional impact, often applied in bi- or tri-polarity of their distribution throughout western, eastern and possibly central Slovakia. From external study results it was concluded that there are diverse tendencies for the different groups within the spatial distribution of dominant attendance regions. Here, detached study-places play an important role, but their distance and spatial accessibility by main transport corridor routes must be considered. All these trends suggest that there are strong pressures on the recruitment of students which is translated into strong competition between Slovak universities in providing higher education. This competitive pressure has a real reflection on the dominant attendance regions of the universities' students. This fact, often combined with very different quality levels of higher education, contributes in some respects to the deepening of regional disparities in Slovakia.

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Dochádzkové regióny študentov verejných vysokých škôl v skupine humanitných, prírodných a všeobecnovzdelávacích vied na území Slovenska v školskom roku 2010/11

V našom príspevku sme sa venovali analýze vybranej skupiny verejných vysokých škôl na Slovensku v súvislosti s trvalým pobytom interných a externých študentov v školskom roku 2010/11. Príspevok sa zameriava na špecifiká v skupine vysokých škôl (resp. ich fakúlt so zameraním na filozofické, teologické, pedagogické, umelecké, prírodné a ostatné spoločenské vedy), pričom naznačuje aj súvislosti s hodnotením

kvality vysokých škôl a fakúlt agentúrou ARRA. Z hodnotiacej správy ARRA (ARRA 2010) vychádza aj rozdelenie vysokých škôl na jednotlivé skupiny.

Vymedzili sme dominantné dochádzkové regióny študentov internej alebo externej formy štúdia pre jednotlivé verejné vysoké školy (ich časti) zaradené svojím zameraním do danej skupiny vied. Naše výsledky sme ich zhrnuli do série máp. V zásade môžeme konštatovať, že existujú veľmi výrazné rozdiely v rozložení dochádzkových regiónov podľa jednotlivých zameraní škôl, alebo ich častí, a to často i v rámci jednej univerzity. Pokiaľ ide o úplnosť údajov, musíme konštatovať, že sme vychádzali z dostupných údajov, ktoré školy dodávajú ministerstvu školstva, pričom sme v niektorých prípadoch zistili výrazné medzery v poskytovaných dátach. Ako sme predpokladali, existujú aj veľmi výrazné rozdiely v rozložení dominantných dochádzkových regiónov medzi študentmi internej a externej formy štúdia. Pokúsili sme sa dať do súvisu i rozloženie dominantných dochádzkových regiónov s hodnotením kvality jednotlivých vysokých škôl podľa ARRA (malé doplnkové mapky). Porovnávanie medzi jednotlivými skupinami by vzhľadom na použitú metodiku nebolo korektné, ale pri porovnaní stupňa hodnotenia dominujúcej vysokej školy z hľadiska dochádzky v danom regióne existujú často výrazné rozdiely medzi interným a externým štúdiom, pričom často platí, že pri externej forme štúdia dominujú školy s nižším hodnotením ako v internej forme štúdia (napr. v skupine prírodných vied). Napriek rozdielnej situácii v jednotlivých skupinách vysokých škôl možno konštatovať, že v žiadnej z týchto skupín nefiguruje škola s dominantným celoslovenským dosahom, naopak prejavujú sa výrazne školy s regionálnym dosahom, pričom sa často uplatňuje bi- alebo tri-polarita ich rozloženia (západné, východné, poprípade stredné Slovensko). Tieto a ďalšie pozorované tendencie naznačujú, že v slovenskom vysokom školstve existujú silné tlaky na získavanie študentov, ktoré sa premietajú do vzájomnej konkurencie vysokých škôl. Tento konkurenčný tlak má reálny odraz aj vo formovaní regiónov dominantnej dochádzky ich študentov. Táto skutočnosť v kombinácii s často veľmi rozdielnou kvalitou vysokých škôl prispieva v určitom aspekte k prehlbovaniu regionálnych disparít v rámci Slovenska (cf. Rehák 2009).

ATTENDANCE REGIONS OF PUBLIC UNIVERSITY STUDENTS IN THE GROUP OF TECHNICAL AND OTHER SPECIALIST SCIENCES IN SLOVAKIA IN THE 2010/2011 ACADEMIC YEAR

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Abstract: The aim of this paper is to analyze a selected group of public universities in Slovakia in relationship to the residents of internal and external students in the 2010/11school year. The schools selected were technical and other specialist science schools, divided into groups according to the ARRA agency. The methodology utilized is based on previous research by the authors.

Key words: public universities, internal and external students, Slovakia, humanities, natural and general education science, ARRA agency.

INTRODUCTION AND METHODOLOGY

The paper builds on the previous article "Attendance regions of public universities students in the group of humanities, natural and general education science in Slovakia in the academic year 2010/11" (Gurňák et. al. 2011). It is based on the same data as in the cited paper. The 2010 report of the Academic Ranking and Rating Agency summarizes public universities and colleges in Slovakia, and for the purposes of this report University faculties were divided into the ARRA 11 groups, according to their similarities (ARRA 2010).

Based on our previous research focused on the allocation of attendance regions of dominant public universities founded on internal data of the Ministry of Education, Science, Research and Sport of Slovak Republic (Gurňák, Križan, Lauko 2009; Gurňák, Križan, Lauko 2010; Lauko, Gurňák, Križan, 2010; Gurňák, Lauko, Križan, 2010), we also decided to apply our procedures to high schools based on their individual focus. The 11 ARRA group division allowed us to compare the quality of individual schools on an extension of the dominant attendance regions.

Vzhľadom na limitovaný priestor príspevkov sme týchto 11 skupín rozdelili na dve časti. V tomto príspevku sme sa venovali piatim z nich, školám so zameraním na: skupinu poľnohospodárskych vied, na skupinu ekonomických vied, na skupinu zdravotníckych vied, na skupinu právnych vied a na skupinu technických vied. Dané školy sme vyhodnocovali po jednotlivých univerzitách, resp. samostatných vysokých školách, pričom do analýzy boli zarátaní len študenti fakúlt s daným zameraním v rámci tej ktorej školy. Konkrétne zaradenie fakúlt do skupín vychádzalo zo správy ARRA (ARRA, 2010). Vyhodnocovali sme samostatne študentov zapísaných buď na internú alebo externú formu štúdia v školskom roku 2010/2011 (išlo o študentov bakalárskeho a magisterského/inžinierskeho štúdia).

Due to limited space, the 11 groups were divided into two parts. In this paper we focused on five of these groups: i) agricultural, ii) economics, iii) medical sciences, iv) a group of law sciences and v) technical sciences. The same evaluation criteria were used for the individual universities, and the group classification of faculties was based on the ARRA agency report (ARRA 2010). Students enrolled in internal and external Bachelor and Masters' study programmes in the 2010/2011 academic year were evaluated separately.

MAJOR RESEARCH RESULTS

We defined the dominant attendance regions of internal and external students for each public high school included in the specific science groups. Limited space precludes the detailed description of this issue, and therefore the theme was summarized in a series of maps. We found very significant differences in the distribution of attendance region by individual group of high schools or their parts, and often even within one university. For data completeness, available data provided to the Slovak Republic Ministry of Education, Science, Research and Sport by all schools was utilized. In the analysis we included students resident in specific Slovak municipalities. While considering those students residing outside Slovak territory,, the proportion of such students was found to be relatively high in some high schools, although it is generally lower than in the group of schools analyzed in our previous paper: "Attendance regions of public universities students in the group of humanities, natural and general education science in Slovakia in the academic year 2010/11" (Gurňák et. al. 2011). The proportion of these students is quantified by red numbers in the graphs.

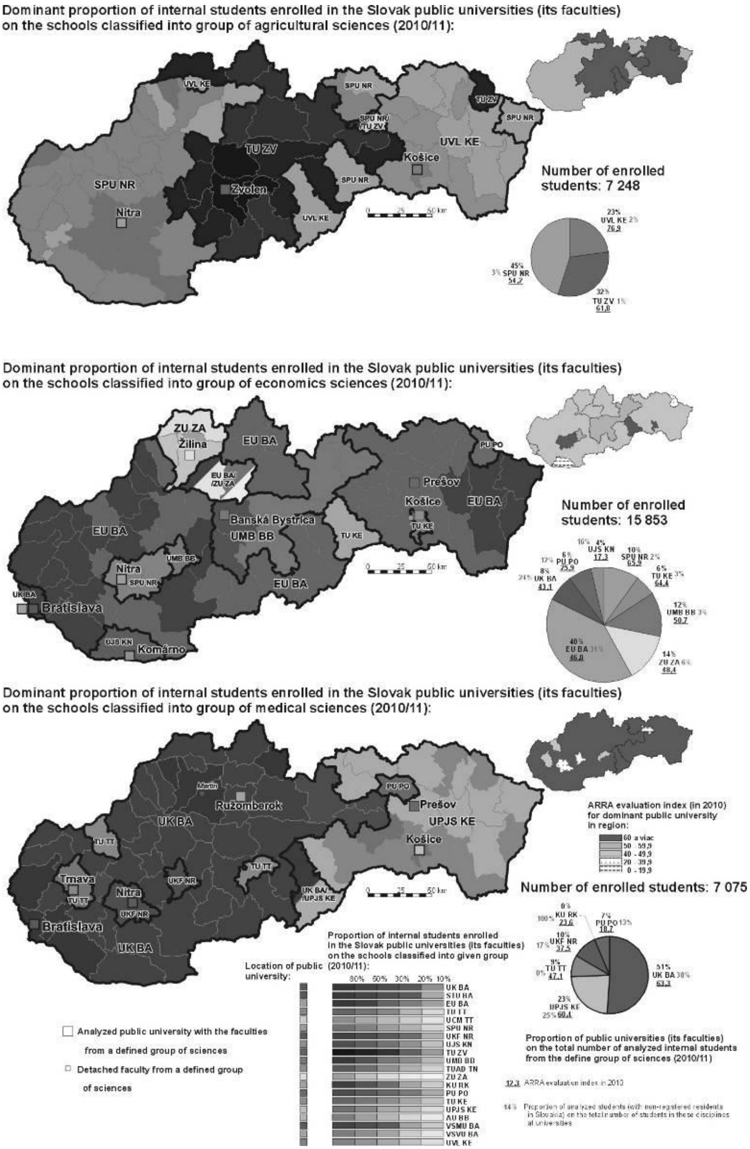

Fig. 1: Dominant attendance regions of internal students enrolled at public universities in Slovakia during the 2010/2011 academic year; classified into agricultural, economics and medical sciences groups.

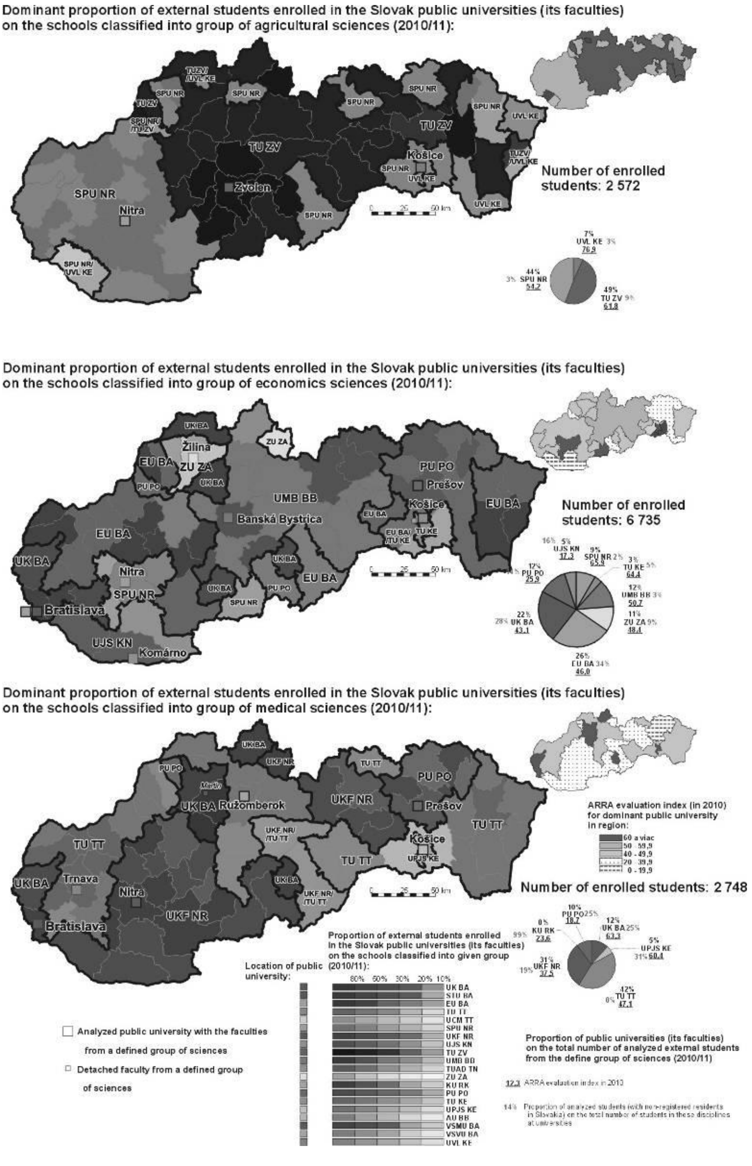

Fig. 2: Dominant attendance regions of external students enrolled at public universities in Slovakia during the 2010/2011 academic year; classified into agricultural, economics and medical sciences groups.

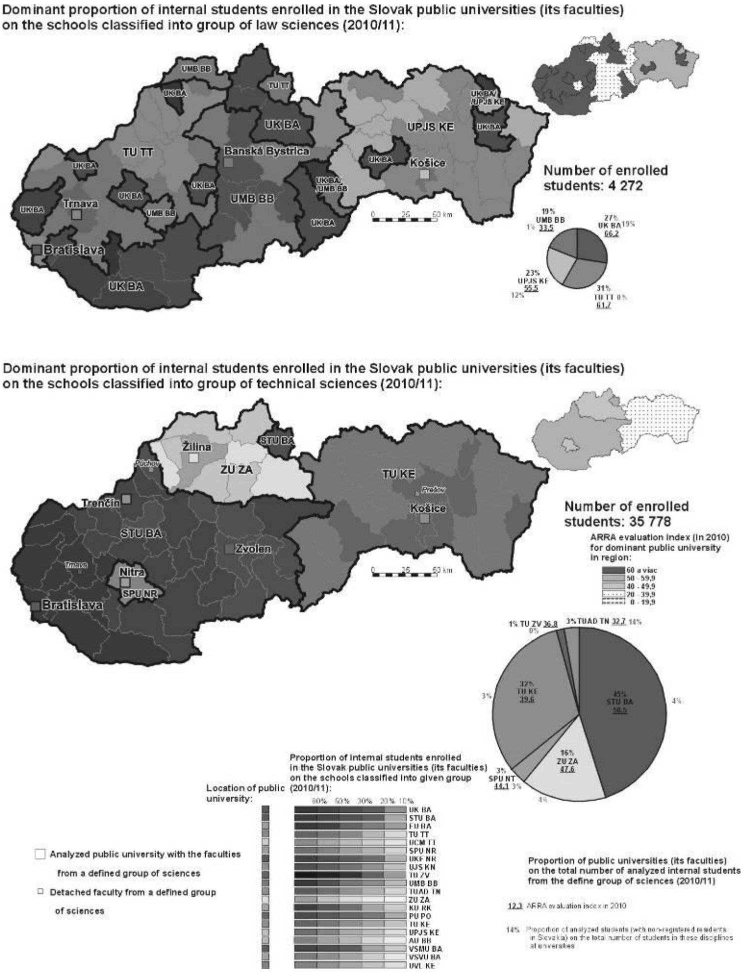

Fig. 3: Dominant attendance regions of internal students enrolled at public universities in Slovakia during the 2010/2011 academic year 2011; classified into law sciences and technical sciences groups.

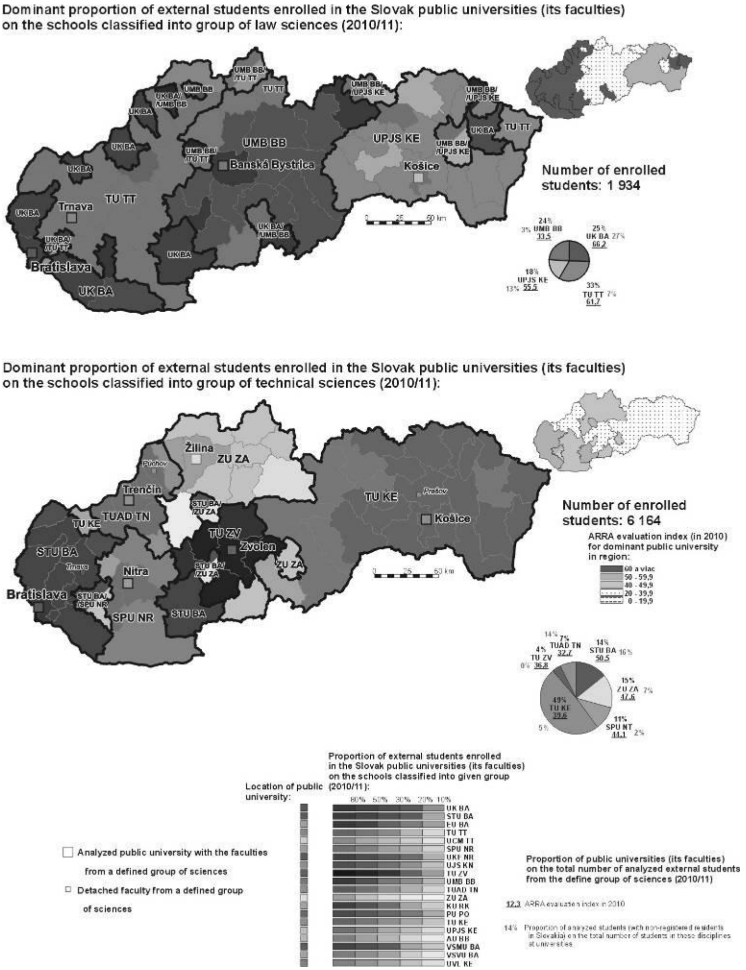

Fig. 4: Dominant attendance regions of internal students enrolled at public universities in Slovakia during the 2010/2011 academic year; classified into law sciences and technical sciences groups.

As could be expected, there are very significant differences in the distribution of the dominant attendance regions among internal and external students.The relationship of the distribution of the dominant attendance regions with the assessment of individual universities according to ARRA agency is depicted on small additional maps. Within the given methodology, cross-checking between different groups of schools would be incorrect, but when we compare spatial aspect of the dominant university in terms of attendance region, there are some significant differences between internal and external study. The most visible differences are noticeable in the medical sciences school groups. The schools with the highest ARRA score clearly dominated internal student numbers,while those with the lowest Arrra ranking dominated external study.

CONCLUSION

Despite different situations within these diverse groups of universities, it can be concluded that only the Economic Science group at the Economics University in Bratislava maintains a dominant nationwide impact. Results for other school groups show that many schools have a regional impact, often applied in the bi- or tri-polarity of their distribution in western, eastern and central Slovakia. However, polarity centres differ, with Košice and Prešov in the east, Banská Bystrica, Žilina and Zvolen in the centre and Bratislava, Nitra and Trnava in Western Slovakia. External study has diverse tendencies of spatial distribution of dominant regional attendance. Here, detached study-places and independent faculties, as for example in the Economics University, play an important role. All these trends suggest that even in the analyzed group of schools there are strong pressures on student recruitment, reflected in the competition between universities. This competitive pressure has a dramatic influence on the shaping of dominant attendance regions for the schools. These facts, often combined with very differing quality of higher education contributes in some aspects to the deepening of regional disparities within Slovakia. Although in the analyzed groups of schools, However, this effect appears more moderate in the analyzed groups of schools than in the other school groups.

Acknowledgement: This paper was created thanks to the financial support of VEGA grant No. 1/0454/09, entitled "Regional disparities in the context of regional development: analysis of their formation and moderation".

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Dochádzkové regióny študentov verejných vysokých škôl v skupine technickych a ostatních vzdelávacích vied na území Slovenska v školskom roku 2010/11

V našom príspevku sme sa venovali analýze vybranej skupiny verejných vysokých škôl na Slovensku v súvislosti s trvalým pobytom interných a externých študentov v školskom roku 2010/11. Príspevok sa zameriava na špecifiká v skupine vysokých škôl (resp. ich fakúlt so zameraním na právne, ekonomické, medicínske, technické a poľnohospodárske vedy), pričom naznačuje aj súvislosti s hodnotením kvality vysokých škôl a fakúlt agentúrou ARRA. Z hodnotiacej správy ARRA (ARRA 2010) vychádza aj rozdelenie vysokých škôl na jednotlivé skupiny.

Vymedzili sme dominantné dochádzkové regióny študentov internej alebo externej formy štúdia pre jednotlivé verejné vysoké školy (ich časti) zaradené svojím zameraním do danej skupiny vied. Naše výsledky sme ich zhrnuli do série máp. Môžeme konštatovať, že existujú veľmi výrazné rozdiely v rozložení dochádzkových regiónov podľa jednotlivých zameraní škôl. Pokiaľ ide o úplnosť údajov, musíme konštatovať, že sme vychádzali z dostupných údajov, ktoré školy dodávajú ministerstvu školstva, pričom sme v niektorých prípadoch zistili výrazné medzery v poskytovaných dátach. Ako sme predpokladali, existujú aj veľmi výrazné rozdiely v rozložení dominantných dochádzkových regiónov medzi študentmi internej a externej formy štúdia. Pokúsili sme sa dať do súvisu i rozloženie dominantných dochádzkových regiónov s hodnotením kvality jednotlivých vysokých škôl podľa ARRA (malé doplnkové mapky). Porovnávanie medzi jednotlivými skupinami by vzhľadom na použitú metodiku nebolo korektné, ale pri porovnaní stupňa hodnotenia dominujúcej vysokej školy z hľadiska dochádzky v danom regióne existujú často výrazné rozdiely medzi interným a externým štúdiom, pričom často platí, že pri externej forme štúdia dominujú školy s nižším hodnotením ako v internej forme štúdia (napr. v skupine zdravotníckych vied). Napriek rozdielnej situácii v jednotlivých skupinách vysokých škôl možno konštatovať, že len v jednej z týchto skupín, v skupine ekonomických vied, existuje škola s dominantným celoslovenským dosahom, naopak väčšinou sa dominantne prejavujú výrazne školy s regionálnym dosahom, pričom sa často uplatňuje bi- alebo tri-polarita ich rozloženia

(západné, východné, poprípade stredné Slovensko). Všetky spomenuté tendencie naznačujú, že aj v skúmaných zameraniach slovenského vysokého školstva existujú silné tlaky na získavanie študentov, ktoré sa premietajú do vzájomnej konkurencie vysokých škôl. Tento konkurenčný tlak má reálny odraz aj vo formovaní regiónov dominantnej dochádzky ich študentov. Táto skutočnosť v kombinácii s často veľmi rozdielnou kvalitou vysokých škôl sa nepochybne tiež podieľa na prehlbovaní regionálnych disparít v rámci Slovenska, hoci v analyzovaných skupinách škôl je tento dopad zrejme miernejší ako vo zvyšných skupinách škôl.

METHODS OF SPATIAL CLUSTERING IN A CITY

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Abstract: *The study of inequality of socioeconomic phenomena in urban areas may provide useful recommendations for targeted social policy, local measurements, urban planning and investment strategies. Among various tools we select spatial heterogeneity indexes, spatial autocorrelation measures, the LISA analysis and the spatial hierarchical clustering. The most promising outputs we obtain from last two methods. LISA allows indicating seeds of segregation and detecting localities even not nominated by experts yet. The LISA analysis reveals clusters of anomalous values, but results are heavily influenced by neighbourhoods. The methods of spatial hierarchical clustering are implemented in a new database application which is under development. This application standardizes data, calculates measures of similarity among objects, applies various methods of aggregation and applies different spatial relationships. First results show the ability to identify homogeneous clusters inside selected localities; nevertheless a continuous extended research is required to optimise these methods.*

Key words: *spatial heterogeneity, spatial hierarchical clustering, LISA, spatial autocorrelation*

INTRODUCTION

Studies of heterogeneity of socioeconomic events distribution in urban areas may provide useful recommendations for targeted social policy, local measurements, urban planning and investment strategies. Traditionally used Gini index may be for regional inequalities replaced by or Theil index (Netrdová, Nosek 2009). Incrementally the analyses incorporate also various special indexes for measurement of heterogeneity in urban areas which take into account common premises about distribution of discriminated and excluded groups of people. These indexes quantify different aspects of heterogeneity for the whole area (city) and do not provide local views where these groups are more or less segregated. The indexes may be applied for different levels of territory subdivisions and smaller units usually demonstrate more heterogeneity.

Typically the individual data is primarily located by address points. It is possible to aggregate this data to different territorial units. Nevertheless any aggregation causes changes of data and also relationships, which is certainly unwelcome. The challenge is to try to process data on this atomic level, explore and evaluate methods that can be used for the studies of spatial clustering. We select spatial autocorrelation measures, the LISA analysis and the spatial hierarchical clustering.

The pilot area is Ostrava city. A special attention is given to 13 known excluded localities (GAC 2006, Kvasnička 2010). The study follows previous analyses and reports (i.e. Horák et al. 2009, Horák et al. 2010).

Data describes selected unemployment characteristics, population and age distribution. The data is geocoded using address points from GIS of the Ostrava city and the RSU. The success rates for geocoding the register of unemployed persons and for geocoding the register of population reach almost 100% (Horák et al. 2010).

Data is analysed using the factor analysis (Hendl 2006, Meloun et al. 2005). The factor analysis provides 5 significant factors (the population factor, the unemployment factor, the factor of unemployment of young people, the factor of the disadvantaged unemployed, the factor of the unemployed with a low degree of education).

Following indicators are selected for measurement of heterogeneity - share of long-term unemployed persons (ULT), share of unemployed with low education (UBE) and the share of registered unemployed to inhabitants in productive age (UP). The last indicator can substitute the rate of unemployment (UR) due to the high correlation of both indicators (Horák et al. 2009). For some part of studies the number of relevant group of people is taken into calculations.

SPATIAL HETEROGENITY INDECES

We select indicators for evaluation representing different aspects of clustering (representatives may be found in Massey, Denton 1988, practical applications i.e. Guillain, Gallo 1996, Ivan, Horák 2011) for following hierarchical levels of the city: 23 town districts, basic urban units, basic statistical units, raster models; usually for four instants of time. The heterogeneity indexes are calculated for number of unemployed, number of unemployed with a low degree of education and the number of long-term unemployed more than 12 months.

We find a mild segregation of the job seekers even for the level of town districts. Studying the temporal comparison we find almost no differences for the given time interval. The results showed that the spatial heterogeneity indexes data almost did not change during the observed year. The **concentration index** reaches high values of all observed variables which may indicate preferences of unemployed people to live in densely built-up areas. The **dissimilarity and interaction indexes** provide similar values for all three variables (about 0,2) indicating small level of separation (higher for unemployed with low education) and interactions. The **isolation index** shows low values for all observed variables (the highest one for the number of unemployed with a low education). The **segregation index** value for the number of unemployed with a low education reaches high values (0,52 and 0,53 in 2009 and 2010 respectively – Soukup, 2011) which proves the premises of mutually separation of these groups. In this case it would be necessary to move more than 50 % of all the unemployed with a low education within the whole city to reach an even distribution. Index of isolation for other variables are almost 3x times smaller.

The spatial heterogeneity indexes evaluate the overall situation and do not fit to determinate in which locations the unemployed segregation is higher or smaller.

SPATIAL AUTOCORRELATION

The spatial autocorrelation is evaluated using Moran's I criterion (Anselin 1988, Zhang et al. 2007, Horák 2006, Netrdová, Nosek 2009). We propose a higher level of global spatial autocorrelation (for address points) may indicate a higher segregation for the given attribute. The analysis is important also for determination of appropriate neighbouring scheme (weighting scheme) applied subsequently in LISA analyses (Anselin 1995).

Results of the global analysis of spatial autocorrelation show the most significant spatial association for the number of unemployed and the number of job seekers with a low education (of course, the measurement of absolute values includes the influence of a building type and a building density). Values of Moran's I criterion show significant changes for extension of the neighbourhood (using Euclidean distances) and enable to discover the distance for maximum autocorrelation effect (50 m) (fig.1).

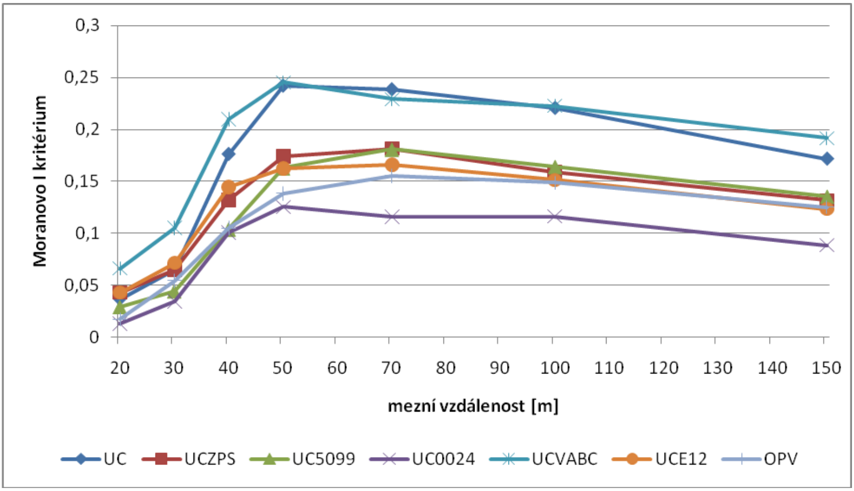

Fig. 1.: Moran I depending on Euclidean distance threshold (selected attributes, Ostrava, 30. 9. 2009) (Soukup, 2011).

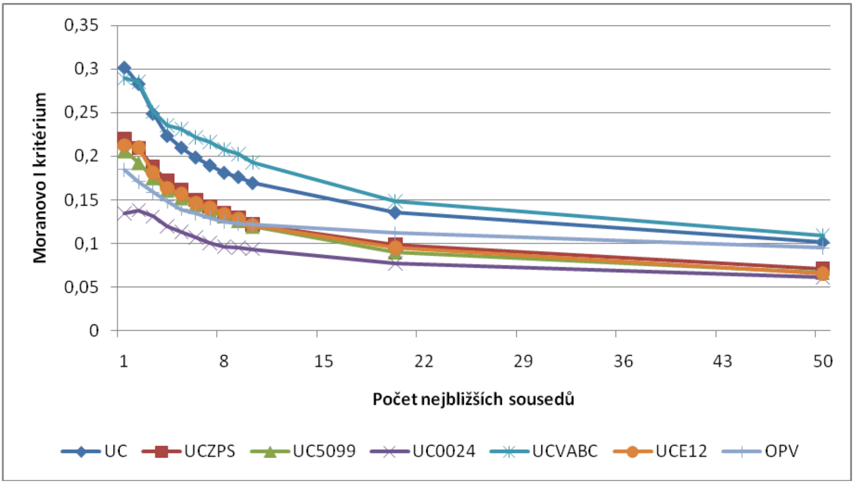

Fig. 2: Moran I depending on the number of nearest neighbours (selected attributes, Ostrava, 30. 9. 2009) (Soukup, 2011).

This anomaly can be explained by an insufficient number of houses for small distances (bellow 50 m) and a high preference of small family dwellings where we meet totally different pattern of unemployment and its correlation. These reasons issue to smaller autocorrelation for smaller distances.

The spatial autocorrelation for neighbourhood based on raising number of neighbours (k-nearest neighbours) show a nice distance-decay effect (fig.2).

The local statistics (LISA) allow to identify hot spots and cold spots of variables and to indicate this way seeds of segregation (fig.3). We use a weighing scheme with the threshold distance of 50 metres. Occurrences of these cores of segregations in selected localities prove the suitability of LISA application for detection of such localities. The satisfactory coincidence appears for the number of job seekers with a low education and the number of long-term unemployed more than 12 months. The LISA analysis also identified other localities not nominated by experts yet. The LISA analysis reveals clusters of anomalous values, but results are heavily influenced by neighbourhoods.

SPATIAL HIERARCHICAL CLUSTERING

Common hierarchical clustering methods are based on finding similarities among multidimensional (lexical multidimensionality) objects and classification them to clusters (Meloun et al. 2005, Lukasová et Šarmanová 1985, Gower 1967). Hierarchical clustering can be made by agglomeration (joining the most similar objects together to create clusters of homogeneous members) or by division (start with one large cluster and consequently divide them). The similarity of objects is measured using correlation and distance measures (suitable for quantitative data), and association measures (suitable for qualitative data). The most common distance measures include Euclidean, Euclidean square, Manhattan (L1norm) and Mahalanobis distances. Hierarchical aggregation methods offer complete linkage, single linkage, average linkage, Ward's method, centroid method and median methods (Meloun et al. 2005), some of them with additional weighting (Calvarho et al. 2009).

Traditional methods do not deal with a space and joined objects without any spatial constraints or preferences. Spatial hierarchical agglomeration methods represent a modification in order to limit the identification of strictly contiguous geographical regions with similar social-economic characteristics (Calvarho et al. 2009). We are trying to evolve this idea to implement also other form of spatial relationships.

Fig. 3: LISA for variables: number of unemployed (labelled UC), number of unemployed with low education (UCVABC), share of unemployed with low education (PCABC) and the share of registered unemployed to inhabitants in productive age (PUC_OPV) (Přívoz locality, 31. 3. 2010)

The methods of spatial hierarchical clustering are implemented in a new database application which is under development. This application standardizes data, calculates measures of similarity among objects, applies various methods of aggregation, calculates coordinates of the new cluster and its properties (currently values of explored attributes) and namely applies different spatial relationships (currently Euclidean distance and contiguity based on queen scheme of Thiessen polygons).

First results show the ability to identify homogeneous clusters inside selected localities (fig.4-6). The outputs are sensitive to selection of appropriate threshold values for maximum distances. In this case we use a threshold of 15% for differences in one attribute and average 15% for 3 attributes. Using higher threshold we will obtain larger clusters.

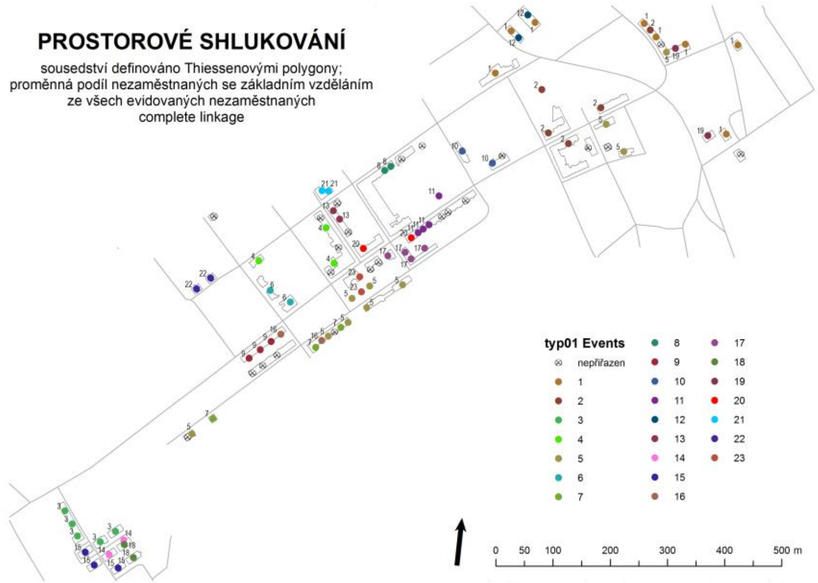

Fig. 4: Clusters for Přívoz (spatial contiguity: Thiessen polygons + queen scheme; attributes: standardized share of unemployed with low education; date 30.11.2010; lexical distance: Euclidean; aggregation method: complete linkage).

We test two type of neighbouring – Thiessen polygons and Euclidean distance up to 50 m. The second one seems to provide more promising results.

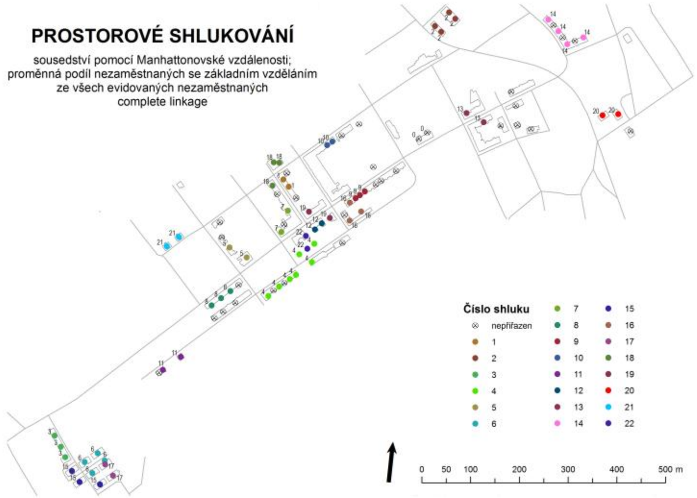

Fig. 5: Clusters for Přívoz (spatial contiguity: Euclid. distance < 50 m; attributes: standard. share of unemployed with low education; date 30.11.2010; lexical distance: Manhattan; aggregation method: complete linkage).

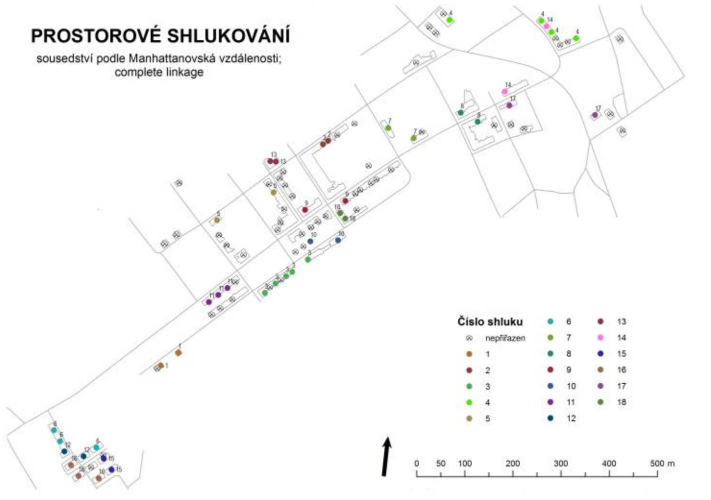

Fig. 6: Clusters for Přívoz (spatial contiguity: Thiessen polygons + queen scheme; standardized attributes: UP, UBE, ULT; date 30.11.2010; lexical distance: Manhattan; aggregation method: complete linkage).

CONCLUSION

Indication of abnormal clusters in the urban areas may utilise LISA which can be easy implemented. For Ostrava it is recommended to use neighbourhood defined by Euclidean distance with threshold of 50 meters.

The deeper study of clustering requires implementation of spatial hierarchical clustering methods. First results show the ability to identify homogeneous clusters inside selected localities; nevertheless a continuous extended research is required to optimise these methods.

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Metody prostorového shlukování v městském prostředí

Studium rovnoměrnosti distribuce socioekonomických jevů v městském prostředí může poskytnout užitečná doporučení pro cílenou sociální politiku, přijímání lokálních opatření, ovlivnit územní plánování a investiční záměry v jednotlivých lokalitách. Vedle klasických nástrojů typu Gini koeficient či Theilův index se používají různé indexy heterogenity, jako jsou indexy izolace, segregace, koncentrace apod. Všechny hodnotí významnost rozdílů v distribuci zkoumaného jevu hodnoceného po jednotlivých územních jednotkách a charakterizují celou obec (město) z hlediska daného typu heterogenity. Ne vždy je však administrativní dělení území vhodné a reprezentuje skutečně homogenní jednotky z hlediska zkoumaného jevu.

Atomickou úroveň popisu jevu představují adresní body nesoucí potřebné údaje. Příspěvek demonstruje využití globální a lokální míry autokorelace a prostorového hierarchického shlukování pro bodově vybrané základní demografické a ekonomické charakteristiky v prostředí Ostravy.

Pomocí indexů prostorové heterogenity byla zkoumána distribuce nezaměstnaných, nezaměstnaných s nízkým vzděláním a dlouhodobě nezaměstnaných pro městské obvody, ZSJ, SO a pravidelné čtvercové sítě pro několik časových řezů. Nejvyšší hodnoty dosahuje index koncentrace pro všechny uvedené atributy a index segregace pro nezaměstnané s nízkým vzděláním.

Na základě Moranova I kritéria byl studován vliv sousedství a rozdíly v chování jednotlivých indikátorů. Pro malé vzdálenosti vykazuje graf anomální chování a efektivně může být využito až vzdálenosti 50 m. LISA poskytla velmi zajímavé výsledky, zejména pro identifikaci jader vyloučených lokalit a odhalila i některé lokality nepopisované experty.

Pro hlubší studium situace je vhodné použít prostorového hierarchického aglomerativního shlukování. Vyvíjená databázová aplikace dovoluje aplikovat většinu typů lexikálních vzdáleností, které se běžně používají (chybí dosud Mahalanobisova) a rovněž většinu aglomeračních metod. Pro výběr sousedních prvků se použily Thiessenovy polygony nebo vzdálenosti do 50m. K vykreslování shluků bylo použito limitu přibližně 15 % maximálního rozdílu v hodnotě 1 atributu. Jako více perspektivní se jeví používání sousedství založeného na vzdálenosti, nicméně je potřebné ještě provést řadu testů k získání optimálních výsledků.

ROMA ETHNICITY AND POVERTY IN THE NITRA REGION

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Abstract: *Ethnicity is generally in different countries an important element in the structure of poverty and inequality. Although statistically not show in terms of ethnicity, because respect for human rights cannot be overlooked that a significant proportion of the Roma ethnic minority in Slovakia live in poverty, respectively in misery. In Slovak conditions, poverty is often represented by the Roma ethnicity, mainly due to their low education and qualification, which disqualify them for the labor market. It should be noted however that the majority of Roma live in Slovakia integrated into mainstream society, and especially non-segregated from mainstream society.*

Key words: *Roma ethnicity, poverty, Nitra region, the indicator*

INTRODUCTION

Modernization and progress in society not only brings positive results and phenomena, but also undesirable negative such as the poverty (VESELOVSKÝ, 2006). Poverty is a phenomenon that occurs in every society, irrespective of its economic level, population, location and area of the country and other facts (VESELOVSKÝ, 2007). Although poverty in Slovakia after 1989 exposed, there is not legislative intended and used more or less as a metaphor (VESELOVSKÝ, 2006b). Long ago, poverty is associated not only with physical survival, or life without harm to health but also the lack of resources to ensure the basic food necessary for life or a certain socio-cultural life aspects of each individual of society (VESELOVSKÝ, 2008). Lack of income to ensure coverage commonly carried consumer spending pushes many people to complete the margins of society, what really worries the population potentially at risk of poverty (VESELOVSKÝ, 2008b). Definition of poverty is adopted by the States of the European Union in the mid-eighties of the 20st century. According to this definition, the concept of poverty refers to persons, families or groups of persons whose material and social resources are so limited that they are excluded from the minimum accepted life-style states in which they live (VESELOVSKÝ, 2009).

Ethnicity is generally in different countries, an important element in the structure of poverty and inequality. In Slovak conditions, poverty is often represented by the Roma ethnicity, mainly due to their low education and qualification, which disqualify them for the labor market (MICHÁLEK, 2005). Any analysis of the Roma issue is subject to a generalization. It is not only due to inaccuracy of statistics on the Roma, but also a great civilization and differentiation of the Roma community in Slovakia. Many of the arguments about Roma in Slovakia can be understood only in optics by trends, respectively apply them to a specific part of the Roma community. It should be noted that the majority of Roma live in Slovakia integrated into mainstream society, and especially non-segregated from mainstream society.

Roma are the second largest ethnic minority in Slovakia. At the last census, the Roma minority are enrolled less than 80 000 inhabitants, which represents 1.4% of Slovak population. Estimated number of Roma in Slovakia is several times higher. According to municipal and local government offices materials in 1989 lived in Slovakia this year 253 943 Roma (4.8%). However, these statistics registered only a socially disadvantaged citizens. It can therefore be assumed that the number of Roma in Slovakia is even higher. At present, the expert estimates range between 480 000 to 520 000 and given the high birth rate of Roma population, that number is increasing.

Demographic behavior and demographic reproduction of the Roma population differs from the reproductive behavior of the majority population. In terms of age structure are the largest group of Roma children in the age group 14 years, which makes up 43.4% (the other inhabitants of Slovakia's total 24.9%). Age group 15 to 29 per year is represented by 29.8% (22.8%). In other age groups is visible reduction in comparison with the structure of the population in Slovakia: age cohort 30 to 40 year - 17.0% (22.0%), 41 to 59 year - 6.2% (14.5%) and age cohort of 60 and are perennial in the Roma population represented only 3.6% (14.8%). Due to high birth rates and higher mortality levels constitute four fifths of the Roma population under the age of 34 years (National Human Development Report, 2003).

The Roma family is an entirely different demographic than the majority type of family. In the area of partnerships can be identified as a high number of early sexual activity and the beginnings of a relationship (before 18 years of age) but a low divorce rate. Divorce as a way to end the first marriage occurred in 3.7% of Roma men and 3.4% of Roma women. In the typical Roma family is large number of children. Differences are visible when comparing the number of children per one Roma woman (4.2 children), which is more than twice the mothers to non-Roma population (1.51). In the case of Roma families living in deprived settlements that average children per family is 7.8 children (BAČOVÁ, ZEĽOVÁ, 1993).

ROMA ETHNICITY – AN INDICATOR OF POVERTY

Although statistically not show in terms of ethnicity, because respect of human rights cannot be overlooked that a significant proportion of the Roma ethnic minority in Slovakia live in poverty, respectively to misery. Roma poverty is in terms of poverty indicators primarily due to their exclusion from the labor market and consequent unemployment, multiple families, as well as low educational attainment of Roma. In the Nitra region do not separate settlements, starting from a low (reported) number of the Roma ethnic group. Despite the inaccuracies in the statistics referred to consider the source (SOBD, 2001) as the only official and legitimate, and on this basis we decided to also use it for that indicator.

In the study area we have seen the proportion of the Roma ethnic group in the population (mean value - 07/01/2001) (in %). According to the census in 2001 the share of Roma represented 1.9% of the total population of Slovakia (a large proportion of Roma is probably subscribed to the Slovakian and Hungarian, the statistics do not capture), in the Nitra region is the value of 0.63% (4741 Roma). Although this value is not high, there is considerable concentration in

145 municipalities with Roma ethnic group (the Roma are not in - 209 municipalities - 58.8% of the region municipalities). The value of the Nitra region (0.63%) is compared with the average in Slovakia (1.9%) lower by 1.27%. Stratification in the area of the region - in the districts is as follows.

Komárno district has the highest proportion of Roma (1.11%) and district Levice (1.03%). Very high value generated also Šaľa district - nearly one percent of the population. The average level of the Roma ethnic group of Nitra region has Nové Zámky district (0.62%), placing into the center (third) set of statistical pentil (Table 1, Map 1) (VESELOVSKÝ, 2009b).

Tab. 1: Roma ethnicity in Nitra region (2001)

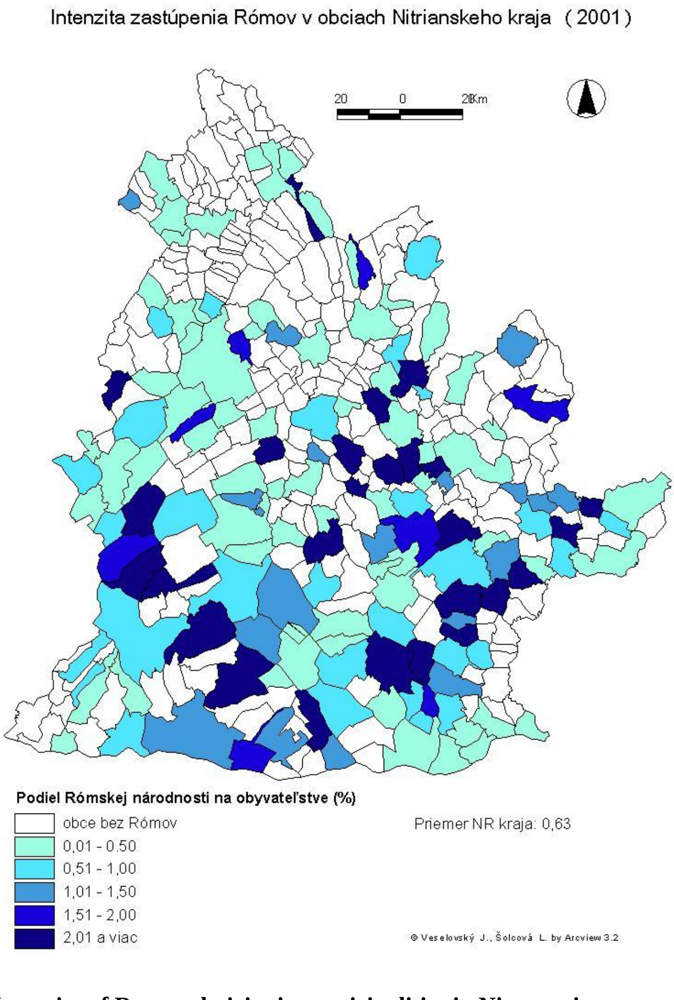
District/region	**number**	**(%)**
NR	579	0,35
ZM	66	0,17
TO	146	0,19
SA	539	0,99
NZ	958	0,62
KN	1211	1,11
LV	1242	1,03
NR region	**4741**	**0,63**

Source: SODB, 2001

Low allocation of ethnicity can be seen in the district of Zlaté Moravce (0.17%), Nitra (0.35%) and Topoľčany (0.19%). District Zlaté Moravce with the number of Roma came under the region average of 0.46%. Most numerous ethnic group is in the southern region - districts Komárno, for example Modrany municipality (4.36%), which are characterized by higher unemployment (22.02%). Above-average values in the southern part of the region are then allocated in Levice, for example Šarovce (13.1% representing 212 Roma), Tehla (2.47%), Lok (2.46%). These municipalities, in addition to a high proportion of Roma with a high level of unemployment (eg Tehla 23.22% unemployed), the value of above-average long-term unemployment (eg Lok 69.13% unemployed) and a considerable amount of basic education (eg Šarovce 55.7 %). The third high percentages of ethnic groups in the southern region is characterized by Nové Zámky district (circuit Štúrovo), municipalities focus to the border district of Levice. At these groups include Svodín (2.27%), Bruty (2.14%) - the village is characterized by a high share of low education (Bruty 56.41%). Significant enclaves of Roma are concentrated in the western region in the district Šaľa as Hájske (2.1%), Selice (3.8%). Municipalities are characterized by high long unemployment (Selice 62.71%). Significantly lower values for the indicator shows that the northern part of region – Topoľčany district, the central part of the region (district Nitra) and northeast of region - district Zlaté Moravce. Municipalities of these districts have not a majority population of Roma nationality.

In terms of pentil layout of municipalities fall on the first interval of 18.1% (44.4% of the municipalities comprising the Roma ethnic group) from municipalities of study area, which represents 64 municipalities of the region (Table 2). Pentil has the highest representation in Nové Zámky district (16 municipalities - 25% of municipalities interval) for example Dubník (0.06%), Gbelce (0.04%), Podhájska (0.08%). There are municipalities with from 1000 to 1999 of inhabitans or more than 2000 of inhabitants for example Mojzesovo (0.15%), Komjatice (0.24%), Bánov (0.35%). From the district in pentil are also represented towns Štúrovo (0.34%) and Šurany (0.28%). Substantial representation in the interval has also district Levice (13) municipalities. Represented by municipalities it above of 500–999 people and residents from 1000 to 1999, for example Čajkov (0.09%), Čaka (0.11%), Kukučínov (0.34%). The municipalities has a relatively high unemployment rate (Čaka 18.52%, Kukučínov 28.92% unemployment). Among cities, there is also Levice (0.36%) and Šahy (0.41%). The relatively large representation has Nitra district (11 - municipalities). Participation are generally larger village with more than 2000 inhabitants - Zbehy (0.05%), Cabaj- Čápor (0.09%), Ivánka pri Nitre (0.26%), Lužianky (0.28%). There are a large municipalities with good transport facilities in the backround of Nitra. Other districts in the region are not well represented in pentil (Topoľčany – 8, Zlaté Moravce - 7, Šaľa - 4 and Komárno - 5 municipalities). In total there are 27 municipalities in the interval - 1000 to 1999 inhabitants, 14 - over 2000 inhabitants, 10 - 500-999 inhabitans, only three to 499 people and eight cities of the region.

The second pentil concentrates (29 municipalities – 20,1 % from the interval and 8.2% of the region municipalities). Top has offices in Nové Zámky district (9 municipalities), for example. Bíňa (0.98%), Sikenička (0.6%) - the village is characterized by high long unemployment (Bíňa 69.21% and Sikenička 67.17%). Multiple representation has also Levice district with seven municipalities, for example Vyškovce nad Ipľom (0.86%), Ondrejovce (0.66%). District Komárno concentrated 5 municipalities from the interval. Low representation has district Šaľa (3) of the village - with a stronger presence in higher pentil and district Zlaté Moravce (2 municipalities). Does not representet any municipality Topoľčany district (low representation of Roma ethnic minority in the north region). Overall, the Roma are most concentrated in larger municipalities of pentil (1000-1999 inhabitans - 10 municipalities) or over 2000 inhabitants (7). Very well are represented towns, eg. - Tlmače (0.53%), Želiezovce (0.55%), Nové Zámky (0.57%), Kolárovo (0.66%), Vráble (0.78%) (VESELOVSKÝ, 2009b) (Map 1).



Map 1: Intensity of Roma ethnicity in municipalities in Nitra region

Tab. 2: Pentil representation of Roma ethnicity in Nitra region districts

District/region	Pentil				
	I.	II.	III.	IV.	V.
NR	11	3	3	2	1
ZM	7	2	0	1	0
TO	8	0	1	0	1
SA	4	3	0	1	3
NZ	16	9	3	1	4
KN	5	5	4	1	3
LV	13	7	7	2	13
NR region	**64**	**29**	**18**	**8**	**25**

Source: Šolcová, 2009

The second least well represented (18 municipalities) is the third interval, indicating an increased rate of population of Roma ethnicity. Its representation is 5.1% of the region municipalities and 12.5% of pentil municipalities. Two districts in themselves do not represent the pentil (Zlaté Moravce, Šaľa) and Topoľčany district it has only one small municipality (Svrbice 1.41%). High representation has in the Levice district (7) with a wide number of size categories (small and large) example Plavé Vozokany (1.04%), Sikenica (1.27%), Pukanec (1.11%). These municipalities are characterized by a high proportion of households with several children (Olavé Vozokany 7.18%, Sikenica 9.26%) or higher-value long-term unemployment (57.04% Pukanec long-term unemployed). Above-average representation is a district of Komárno, of which there are three large municipalities - Bajč (1.23%), Moča (1.42%), Marcelová (1.49%) and the town Komárno (1.23%). Nitra and Nové Zámky are just the three municipalities in this interval. Numerically are represented the most of the municipalities by population from 1000-1999 of inhabitans (7), the lowest representation have small municipalities (3). Almost all municipalities of the central interval is characterized by a considerable amount of unemployment.

Representation of municipalities in the fourth pentil is relatively small (8 municipalities), but relatively evenly distributed in the districts (Zlaté Moravce - 1, Levice - 2, Nové Zámky -1, Komárno -1, Nitra -2 and Šaľa has not represented by any municipality). There are municipalities Iža (1.51%), Žikava (1.54%), Nitrianske Hrnčiarovce (1.64%), Vlčany (1.68%), Tekovské Lužany

(1.85%), Bátovce (1.95 %), Svätoplukovo (1.95%) and Ľubá (1.96%). It is usually a medium-sized or large municipalities with high unemployment (Ľubá 26.6%, Tekovské Lužany 24.14% of unemployed) and higher levels of basic education (Ĺubá 42.82%, Vlčany 41.98% of low level of education).

The fifth interval generates a municipalities with the highest proportion of Roma. Allocates 25 municipalities with a share of the region (7.1%) which is 17.4% of pentil municipalities (of 144 municipalities). When viewed in the map no. 1 it is clear that its presence is the best seen in the eastern region and district Levice (13). Although the district is given a typical small municipalities with 499 of inhabitants, the indicator is stratified in pentil especially in medium-sized municipalities. Municipalities stretch from the north to the south of district with dispersed representation in the central western part. In the district of Levice is for example Čata (2.07%), Lontov (2.08%), Lok (2.46%), Tehla (2.47%), Dolná Seč (2.58%), Kozárovce (5.1%), Beša (5.51%), Kalná nad Hronom (5.59%), Hronovce (5.78%), Šalov (6.31%) and three municipalities occupying the highest values in the region - Slatina (10.4%), Šarovce (13.1%) and Dolné Semerovce (20.2%). These municipalities in the fifth pentil clearly correlated with poverty, including through other poverty indicators that show. This transition is reflected in the unemployment rate - Dolné Semerovce (23.1%), Šarovce (38.46%) - the value of unemployment among the highest in the region. Apparent links between those communities with a low level of basic education (Beša 49.54%, Dolná Seč 48.28%). The remaining districts to their communities are less represented in Nové Zámky (4), Šaľa (3) and Komárno (3). For these districts, it appears most compact line extending from Selice (3.8%) over Neded (5.95%), crossing the border district of Komárno through Nesvady municipality (4.65%) to the city Hurbanovo (2.56%) . Roma ethnic group is located primarily in communities that are medium or large - sized in the southern and southwestern parts of the region with an apparent correlation in unemployment, long-term unemployment, basic education and households with several children (VESELOVSKÝ, 2009b).

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CONCLUSION

The above representation of the Roma ethnic group often goes hand in hand with a significant representation of households with several children and low education level in municipalities and many times indicates a problem of employment and the experience of unemployment or long-term unemployment. Currently unemployed are unable to increase their education, thereby reducing their chances on the labor market and often are in poor groups. In the study area we have seen the proportion of the Roma ethnic group in the population (mean value - 07/01/2001) (in %). According to the census in 2001 the share of Roma represent 1.9% of the total population of Slovakia (a large proportion of Roma is probably subscribed to the Slovakian and Hungarian, the statistics do not capture), in the Nitra region is the value of 0.63% (4741 Roma). Although this value is not high, there is considerable concentration in 145 municipalities with Roma ethnic group (the Roma are not in - 209 municipalities, it is 58.8% of the municipalities of the region). The value of the Nitra region (0.63%) is compared with the average in Slovakia (1.9%) is lower by 1.27%. The highest proportion of Roma has Komárno district (1.11%) and district Levice (1.03%). Very high value generated also Šaľa district - nearly one percent of the population. The average level of the Roma ethnic group has Nové Zámky district in Nitra Region (0.62%).

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Romske etnikum a chudoba v Nitrianskom kraji

Vyššie zastúpenie Rómskeho etnika ide často ruka v ruke so značným zastúpením viacdetných domácností a nízkeho stupňa vzdelania v obciach a mnoho krát indikuje problémy so zamestnaním a aj skúsenosť s nezamestnanosťou, prípadne dlhodobou nezamestnanosťou. Práve nezamestnaní sú neschopní si zvyšovať svoje vzdelanie, čím znižujú svoju šancu na trhu práce a často sa zaraďujú do skupiny chudobných.

V záujmovom území sme sledovali podiel Rómskeho etnika na počte obyvateľov (stredný stav - 1. 7. 2001) v (%). Podľa sčítania v roku 2001 podiel Rómov tvoril 1,9% z celkového počtu obyvateľov Slovenska (veľká časť Rómov sa pravdepodobne prihlásila k slovenskej alebo maďarskej národnosti, čo štatistiky nezachytávajú), v Nitrianskom kraji je to hodnota 0,63% (4 741 Rómov). Aj keď uvedená hodnota nie je vysoká, je tu značná koncentrácia v 145 obciach s Rómskym etnikom (Rómovia sa nenachádzajú v - 209 obciach, t.z. 58,8% obcí kraja). Hodnota Nitrianskeho kraja (0,63%) je oproti priemeru Slovenska (1,9%) nižšia o 1,27%. Najvyššie podieli Rómov vykazuje okres Komárno (1,11%) a okres Levice (1,03%). Značne vysoké hodnoty vygeneroval aj okres Šaľa - takmer jedno percento populácie. Priemernú úroveň Rómskeho etnika Nitrianskeho kraja vykazuje okres Nové Zámky (0,62%).

HOUSEHOLDS WITH SEVERAL CHILDREN AS A POVERTY INDICATOR ON EXAMPLE IN NITRA REGION

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Abstract: *The aim of contribution is to refer the households with several children as one of poverty indicator. Bearer of poverty may be also especially families with more children with low incomes. Elimination of income delivery by children to the family (except family allowances) and the allocation of the follow-on individual family members refers to the relationship that the more children in the family (more family members), the lower income of each family member can be and reducing living standards.*

Keywords: *households with several children, poverty, indicator, region Nitra*

INTRODUCTION

The issue of poverty is not a marginal phenomenon in the society, but remarkably affects, according to many experts estimated about one third of the population of our planet (Ondrejkovič, 2004).

The bearer of poverty may also be households with several children especially families with low incomes. Elimination of bringing children into the family income (except family allowances) and the allocation of the follow-up to the individual members of the family refers to the relationship that the more children in the family (more family members), the lower income of each family member and reduce living standards (more children = less money = higher risk of poverty).

The model of a small family that is characteristic of Slovakia as well as Nitra, is a kind of break a third child, whose birth can mean a disproportionate increase in costs for subsequent decline of living standards of the family. It is not only due to the fact that large families must meet with their incomes a larger range of needs, but also that children constitute a barrier to the participation of women - mothers in the labor market. The average amount of net monthly income per capita is declining in Slovakia in households with one child to the level of 75.3% for household with two children to 65.2% and household with several children to 51.0% of average income of childless households. Various forms of material deprivation particularly feel families with more children with both economically active parents economic can oscillate on the edge of subsistence. To this difficult situation has also recently contributed that was absent from the state enhanced support and programs to support families with economically active parents with low incomes (MICHÁLEK, 2005).

HOUSEHOLDS WITH SEVERAL CHILDREN – AN INDICATOR OF POVERTY

Specifically we watched indicator that the proportion of households with several children (3 or more children) of the households total number (%). The average value of the Nitra region is 5.58%.

While demographic variables we met with the disparity in the west-east direction, in this case it is the disparity in the north-south direction. To this territory enter in particular the question of nationalities and their traditions and religiosity. Lower values of south Nitra region are characteristic by Hungarian nationality and their preferred religion. Among the districts are below the mean value of the region the districts of Komárno (1652 households with several children from 44,221 households representing 3.74%), Nové Zámky (4.96%) and Levice (5.01%) in terms of what we consider poverty to be positive (members of the household income is distributed to many people). Average level of household with several children of Nitra district shows Śaľa (5.75%), placing into the center (third) pentil statistical file, which approached of its level close to the middle value (Table no. 1, map. 1). On the contrary – a higher proportion of households with several children in Topoľčany region (7.37%), Zlaté Moravce (6.73%) and Nitra (6.67%) which are characteristic by Catholics. It is obvious that the most numerous of household with several children is located in the northern part (Topoľčany) – eg. Tesáre (12.22%), Orešany (12.3%), Lužany (13.89%), Kamanová (14.49%) in the northeast (Zlaté Moravce district) – eg. Čierne Kľačany (16.2%), Choča (15.43%), Neverice (12.56%), Hosťovce (12.5%) and in the north Eastern part of region (district Nitra) – eg. Vinodol (14.33%), Hosťová (13.39%), Alekšince (12.54%). These rural communities of varying size category are compactly represented in the district. Fragment can be found households with more children also in northern part of Nové Zámky district in the hinterland of the city Šurany eg. Komjatice (10.63%), Hul (10.02%) in the western part of the district – Veľké Lovce (10.52%), Čechy (10%) in the northern part of the district Šaľa – Hájske (10.27%) a fragment in Levice example Tehla (9.22%), Sikenica (9.26%). Higher values are associated with the national composition (often with a predominance of Slovakian nationality), or a high proportion of Roma communities in the Tehla (2.47%), Hájske (2.1%), Sikenica (1.27%), Roma. Low values of households with several children are located in the southern part of Slovakia (districts: Komárno, Levice, Nové Zámky - Štúrovo circuit) and in west part of region (Šaľa district - southwest and west) (Veselovský, 2009).

Tab. 1: Households with several children in Nitra region (2001)

district/region	Households with several children	**General number of households**	Households with several children **(%)**
NR	4221	63242	**6,67**
ZM	1288	19135	**6,73**
TO	2133	28943	**7,37**
SA	1191	20704	**5,75**
NZ	2961	59676	**4,96**
KN	1652	44221	**3,74**
LV	2462	49171	**5,01**
NR region	**15908**	**285092**	**5,58**

Source: SODB, 2001

According to pentil distribution of village accounts for the first margin (lowest value of households with several children) 13.2% of the municipalities, which represents 46 municipalities of the region (Table 2). This pentil has the highest office in Levice (37.8% of the municipalities interval) - are primarily represented by the village until 499 residents, for example Sazdice (2.99%), Bohunice (2.47%), Domadice (2.29%). Low values of this indicator are in Levice and medium-sized town - but their number is only (5) compared to small municipalities, which is 11 (map 1).

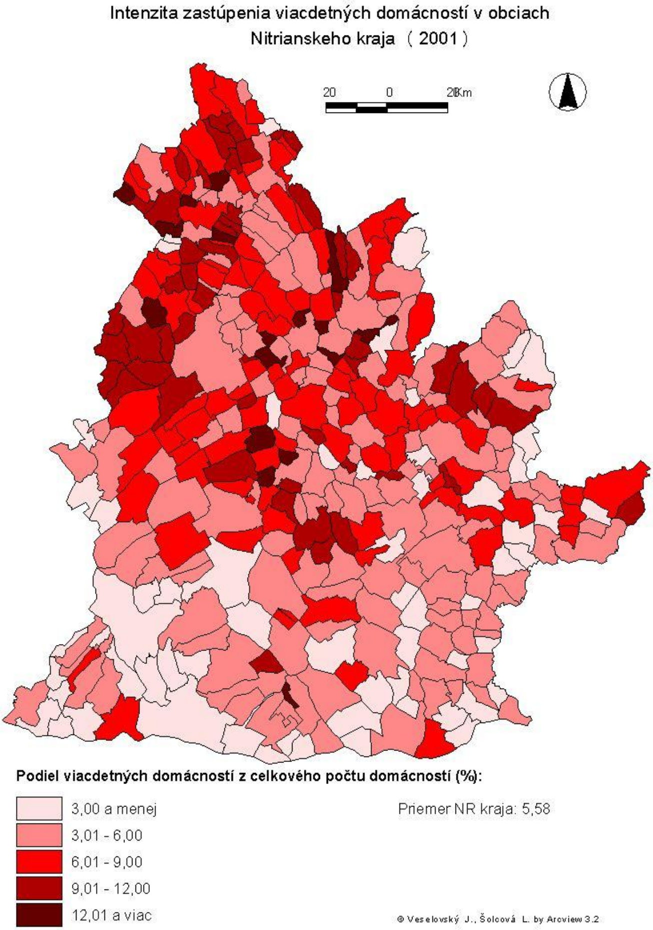
Tab. 2: Pentil representation of households with several children in Nitra districts

district/region	**Pentil**				
	I.	**II.**	**III.**	**IV.**	**V.**
NR	2	16	22	16	5
ZM	2	9	12	3	7
TO	2	10	20	15	7
SA	1	7	2	3	0

district/region	Pentil				
NZ	9	32	12	7	2
KN	14	22	3	1	1
LV	16	37	24	11	1
NR region	**46**	**133**	**95**	**56**	**23**

Source: : Veselovský, 2009

Significantly lower values of households with several children with the highest representation of numerous types shows in pentil district Komárno (14) municipalities. There is a significant belt stretching from north of district to the town Komárno (south district). In the band there are localized communities - Bodzianske Lúky (0.91%), Čalovec (2.65%), Kameničná (1.97%), Patince (1.02%) and Komárno (2.71%). In the western part of the district created an enclave with a low proportion of households with several children - Holiare (2.2%), Brestovec (1.02%), Tôň (2.87%). Widely represented in this district is also pentil Nové Zámky - the location of those municipalities in the district is located primarily in the southeastern part - such as circuit Štúrovo for example Belá (1.28%), Šarkan (1.84%), Malé Kosihy (2.62%). It is a small village with dispersed local binding to the south district. Significantly low values are also included district Štúrovo (2.59%) and the city Nové Zámky (3.31%), but by its value falls already into the next interval. The district there is the village where none has been identified household with several children - Pavlová with 274 inhabitants. The lowest representation of households with several children have districts Zlaté Moravce, Topoľčany, Nitra and Šaľa represented with one or two villages, which is negligible compared to the municipalities analyzed. Municipalities with placing the value into the second and third pentil are uniformly dispersed throughout the region (Veselovský, 2009).



Map 1: Intensity of households with several children of Nitra region

Fourth pentil ranges (9.1 to 12.0%). Their higher values of households with several children represented by 56 municipalities of the region (16% of municipalities). The stratification in terms of representation in the districts is various. The most numerous is located in the district of Nitra (16 municipalities). Creates a bar band extending from Topoľčany, west of the Nitra city to the Nové Zámky district. In that belt threre are for example

Hruboňovo minicipality (9.84%), Lužianky (9.79%), Lukáčovce (9.33%), Báb (10%), Cabaj-Čápor (10.95%), Svätoplukovo (9.33%), Veľké Zálužie (11.02%), Čakajovce (11.08%), ... In addition to the category of small municipalities (Hruboňovo) are represented also medium-sized village category, as well as the village with more than 2000 inhabitants (Veľké Zálužie, Lužianky, Cabaj- Čápor), which to those high value contributed to their location in the hinterland of the Nitra city. Cause of high value in the village Svätoplukovo can be significant by Roma representation in the village (1.95% Roma). Only one municipality less in pentil has Topoľčany (15). Their deployment is a fragment in the district with a higher incidencein the northeast of Topoľčany. This pentil (9.1 to 12.0%) is represent by the Preseľany (9.93%), Ludanice (10.38%) Závada (11.11%), Velušovce (11.05%), Krnča (10, 82%). They are also disproportionately located municipalities in the district Levice, which are ten.

District Komárno, which is characterized by lower values of households with several children is represented only by one municipality. Overall, in that interval are 15 municipalities to 499 inhabitants, 16 municipalities in the range between 500-999 of residents and up to 17 residents from 1000-1999. Large municipalities over 2000 inhabitants is located here (eight). The highest number of households with several children (over 12%) is located in the northern part of the region represented by Topoľčany, Zlaté Moravce (7 villages) and district Nitra with five municipalities. The highest number in the pentil have municipalities with inhabitans to 499 and community residents with500-999. There is no municipality represented by over than 2000 residents, and any town. There are municipalities as Žikava (12.25%), Orešany (12.3%), Tesáre (12.22%), Šurianky (12.37%), Choča (15.43%), Svrbice (22.22% - the highest relative value of households with several children). The analysis shows that the highest values of households with several children are in the northern districts of Nitra region with a dominant representation of Slovak nationality and culture, social practices. The most numerous are those households located in small towns or municipalities of 500-999 inhabitans. Often in the background of larger cities, where there are located more numerous of Roma ethnic (Veselovský, 2009).

CONCLUSION

For Slovakia, as well as Nitra region is characterized by a small family which can cause poor birth of third child. Increase in other family members can mean a disproportionate increase in costs and a consequent fall in living standards of families. This is largely due to the fact that large families must meet income with their wider range of needs, but also that children constitute a barrier to the participation of women - mothers in the labor market. Specifically, we watched indicator that the proportion of households with several children (3 or more children) the total number of households (%). The average value of the Nitra region is 5.58%.

While demographic variables we met with the disparity in the west-east direction, in this case, the disparity is in the north-south direction. Until in that territory enter in particular the question of nationalities and their traditions and religiosity. Lower values of south part in the Nitra region are characteristic of Hungarian nationality and their preferred religion. Among the districts are below the mean value of the region are the districts of Komárno (1652 of households with several children from 44,221of households represented by 3.74%), Nové Zámky (4.96%) and Levice (5.01%) in terms of what we consider poverty to be positive (members of the household income is not distributed to many people). Average level of household with several children in Nitra region shows Šaľa (5.75%), placing into the center (third) pentil of statistical file to its next level approached the middle value. On the contrary - a higher proportion of households with several children are in Topoľčany (7.37%), Zlaté Moravce (6.73%) and Nitra (6.67%), which are characteristic by representation of Catholics

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Work was within the project UGA VII/53/2011 2011 "Specifics of poverty in the Nitra region.municipalities"

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Viacdetné domácnosti ako jeden z indikátorov chudoby na príklade Nitrianskeho kraja

Slovensko ako aj Nitriansky kraj je charakteristická malá rodina v ktorej môže spôsobiť zlom narodenie tretie dieťa. Prírastok ďalšieho člena rodiny môže znamenať disproporčný nárast nákladov a následný pokles životnej úrovne rodiny. Je to v prevažnej miere v dôsledku toho, že rodina s viac deťmi musí uspokojovať so svojich príjmov väčší rozsah potrieb, ale aj v tom, že deti vytvárajú bariéru pre účasť ženy - matky na trhu práce. Konkrétne sme pri uvedenom indikátore sledovali podiel viacdetných domácností (3 a viac detí) na celkovom počte domácností (%). Priemerná hodnota Nitrianskeho kraja je 5,58%. Kým v demografických ukazovateľoch sme sa stretli s disparitou v smere západ-východ, v tomto prípade je to disparita v smere sever-juh. Do tohto územia nám vstupuje najmä otázka národností a ich tradícií a religiozita. Nižšie hodnoty juhu Nitrianskeho kraja sú charakteristické pre maďarskú národnosť a nimi preferované náboženstvo. Spomedzi okresov sa pod priemernou hodnotou kraja nachádzajú okresy Komárno (1 652 viacdetných domácností z 44 221 domácností čo predstavuje 3,74%), Nové Zámky (4,96%) a Levice (5,01%) čo pokladáme z hľadiska chudoby za pozitívne (príjem členov domácnosti nie je rozložený na veľa osôb). Priemernú úroveň viacdetných domácností Nitrianskeho kraja vykazuje okres Šaľa (5,75%), zaraďujúci sa do stredového (tretieho) pentilu štatistického súboru, ktorý sa svojou úrovňou najbližšie priblížil prostrednej hodnote. Naopak – vyšší podiel viacdetných domácností je v okresoch Topoľčany (7,37%), Zlaté Moravce (6,73%) a Nitra (6,67%), ktoré sú charakteristické zastúpením katolíkov.

PERCEPTIONS OF INTEGRATION OF FOREIGNERS BY NATIVE POPULATION IN CHORVÁTSKY GROB – ČIERNA VODA

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Abstract: *Through the research of perceptual integration of minority communities into the majority society, have been surveyed an opinions of native population on integration processes in Chorvátsky Grob – Čierna Voda. The questionnaire consisted of 6 statements structured closed-type responses, while individual responses were structured in terms of gender and age of respondents. By the method of field research and the method of targeted interviews were also detected adaptation strategies of foreigners into the majority society and its structures, and specific effects of their integration (accumulation of residential, ghettoisation, community separation, etc.).*

Key words: *integration, perception, ghettoisation, community separation*

INTRODUCTION

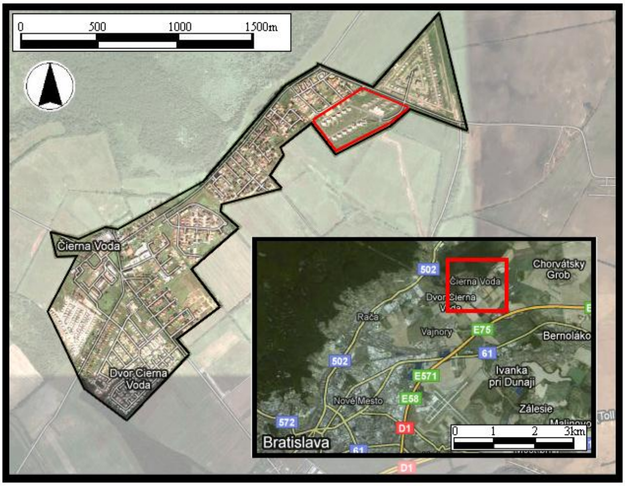
One of the most important conditions of coexistence of minorities and development of their national cultures in the majority society are existing harmonious relations between the various components of a multicultural society, which create and maintain conditions for peaceful coexistence. The uniqueness of the behavior, application of traditional habits and established personal forms of religious expression and promoting the cultures of minority communities is a source of diversity in each of the host society (Hoffman, 2003). Openness in the perception of multiculturalism by the majority, which is traditionalist and conservative-oriented, is usually quite limited. There are so frequently conflicts arising from hatred of "otherness" that hinder the development of any harmonic components, and on the contrary, support acts of intolerance, xenophobia and intolerance. As stated by Gažová (2003), the distinction between "our and foreign" is the most often associated with the concept of ethnocentrism of superior which clearly favoring the value of their own culture before any cultural import. Therefore, the aim of research is determine the level and condition of the elementary rules of life in a multicultural area in the model area Chorvátsky Grob, which is undoubtedly tolerance, ability to live side by side, respecting other cultures and not to interfere to its development. Tolerance does not apply only to selected company, ethnic or social group, but it is a universal principle of human communication (Gažová, 2003).

METHODOLOGY

The aim of research was to determine the views and attitudes of inhabitants in the model area of Chorvátsky Grob on the issue of integration of foreigners who live in the model area longer term. By the research, it was also studied a relationship to the otherness of native population, their perceptions of diversity, as well as their degree of tolerance and openness towards foreigners. Chorvátsky Grob was chosen deliberately because of its new formed part of the village Čierna Voda live, on the basis of temporary residence, family members of Korean managers working in the KIA in Teplička nad Váhom near Žilina. At the same time Chorvátsky Grob can be considered like a satellite village of Bratislava, located 15 km from its center and about 200 km distant from Teplička nad Váhom with a direct connection to the highway D1 (Map 1), which determined the arrival of Korean into. Quantitative research was realized in June 2011 in two parts on a sample of 140 respondents (135 in field research, 5 via an internet questionnaire). Group of respondents consisted of mostly economically active population (aged 20-59 years) and the no active population (over 60 years) community Chorvátsky Grob.

In the first part of the field research, which was performed by questionnaire survey and also through a questionnaire placed on the website of the Chorvátsky Grob was directly surveyed a views of resident population on selected issues. The questionnaire consisted of 6 statements structured with closed-type responses, and individual responses were divided in terms of gender and age of respondents. Like in research of Vašečka (2009), the questionnaire tested the emotional, cognitive and conative component of attitudes of respondents.

The second part of the field research was focused on indicators of residential integration of foreigners (Bargerová, Divinský, 2008) in model area. In addition to field observations were part of the information in this research supplemented by targeted interviews with the inhabitants of the Chorvátsky Grob, who are directly and daily come into contact with foreigners (security guard worked on a closed object of Korean residential area, head of the local supermarket, women on maternity leave). By the methods of field research and targeted interviews were also surveyed an adaptation strategies and reasons of the integration of foreigners into the community of studied area and its structures. At the same time was detected the real state of social distance of the foreigners community and the majority population and associated to their specific effects (accumulation of residential, ghettoisation, community separation, etc.). These effects were also presented by photographic documentation.



Map 1: Spatial localization of Korea residential area under the general of the Chorvátsky Grob – Čierna Voda
Source: Google Earth – Tele Atlas, 2011, prepared by the authors

RESEARCH RESULTS

The first questionnaire was focused on the cognitive component of respondents (Chart 1). The statement "**About the foreigners living in our village we know a little. We should know more.** „ was examined the needs of respondents to get more information about foreigners living in its immediate vicinity, respectively their interest for a nearer common dialogue. Over 2 / 3 responders (62%) in all age groups disagreed with the statement. Information about the foreigners, their lives, culture and other are not considered importance. On the other side 29% of respondents considered important knowledge about foreigners living in the village. This response was most frequently reported by women aged 20-29 years. Male´s responses were, divided according to age, settled.

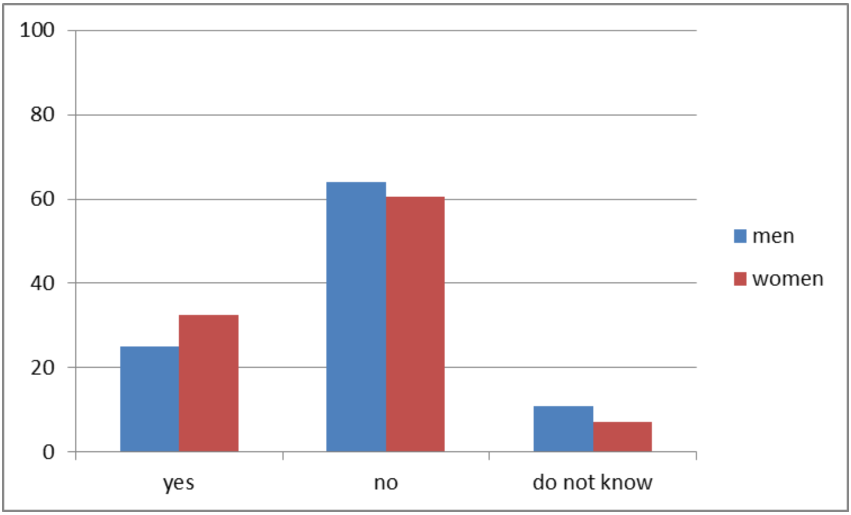


Chart 1: "About the foreigners living in our village we know a little. We should know more.„ (expressed in % by gender)
Source: Authors, field research

Generally concludes that to the elementary rules of life in a multicultural area include tolerance, ability to live side by side, respecting other cultures and does not prevent its development (Gažová, 2003). Through the second statement "**Foreigners and their culture can enrich our village with a new elements and trends**." was examined the conative component of the respondents and their relationship to foreigners, their culture and their tolerance for cultural import (Chart 2). In this case, the responses were relatively unique. Since 90% of all respondents agreed with the statement and the new cultural elements considered like very positive, in several cases to be necessary for a longer life in the village. In general we can said, that the majority of Chorvátsky Grob is open to foreigners and their cultural expression, and there are ready to form a multicultural environment in the village. However we have to say, that the Korean immigrants in Čierna Voda are relatively small group of immigrants, so therefore the real reservations of respondents cannot reflected the answers.

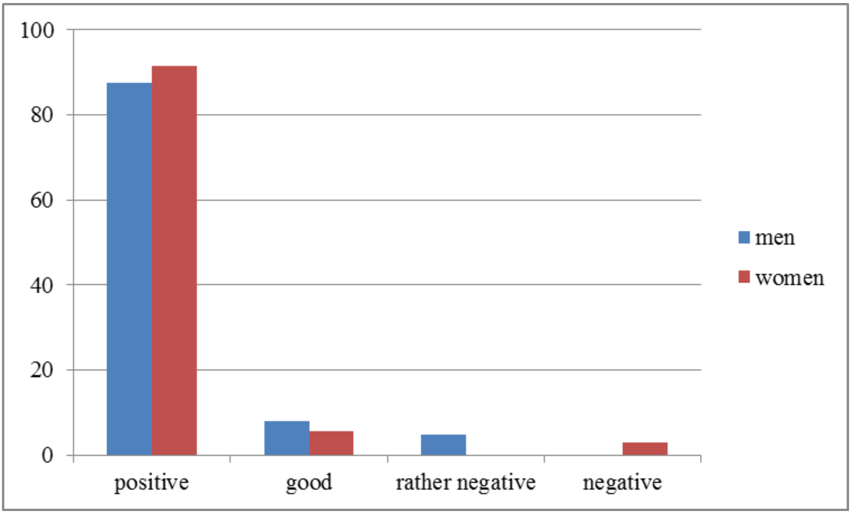


Chart 2: "Foreigners and their culture can enrich our village with a new elements and trends. I see it as ... "(expressed in % by gender)
Source: Authors, field research

Perceptions of the characteristics of behavior of foreigners under the direct experience of the respondents in the village were examined by the following statements aimed at questioning the emotional component (Chart 3). With the statement "**Foreigners in our community are discriminated.**" 100% of the respondents did not agree, which testifies to the high tolerance of respondents towards foreigners and also their efforts to develop a harmonious multicultural environment. Also, the vast majority of respondents (89%) based on statement "**Foreigners in our community are preference.**" Thinks that the local community of Koreans has the same status as other citizens of the village and to account for them as ordinary citizens. Complete 100% of the consensus on the answers, we also recorded the statements "**Foreigners in our village are arrogant and unscrupulous**" as well as in the statement "**Foreigners in our village are problematic.**" Where respondents disagreed with that statement. On the contrary, locals perceive Koreans as a smooth, polite and friendly community, with which the statement by "**Foreigners in our village are polite and friendly**" ownership by almost 97% of respondents. However, the majority of foreigners try to penetrate into the community only minimally. Their contacts with the native population are limited to contact points of the services offered (local supermarket, hairdresser, drugstore, etc.), while to the old part of Chorvátsky Grob they do not walk hardly ever. Therefore, the majority of respondents (86%) and the statement "**Foreigners in our community are invisible**" identified the local community of Koreans to be relatively tight with a high degree of social distance. Several respondents considered the biggest problem is the convergence of social language and related communication barriers, because Koreans do not speak according to their experience or the language of the majority society, even on another world language. Establishing the social dialogue is therefore quite difficult.

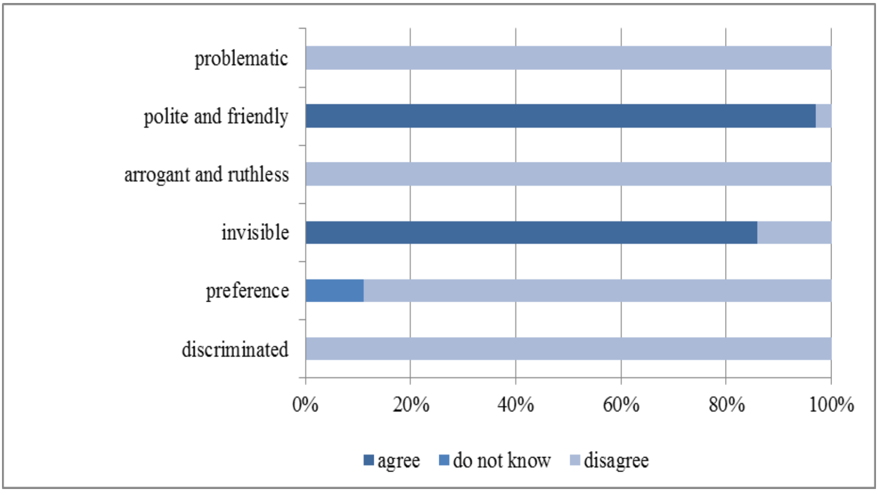


Chart 3: "Foreigners in our community are ..."
Source: Authors, field research

The formation of a multicultural society in the village Chorvátsky Grob will also depend on community efforts to bring foreigners to locals, particularly in this area. At the same time it is not participating in social and cultural activities in the village. This function they replaced lounge located in the residential complex. Other reasons are that Korean women spend time with minors outside of the village (mostly in Bratislava), the absence of men during the week (working in Žilina) and school-age children (studying in Austria).

Significant tolerance and openness of the domestic population in terms of forming a common multicultural environment was reflected also in the responses to the phrase "**Foreigners living in the village hinder me**." More than 96% of respondents disagreed with this statement and only 4% of respondents could not answer the statement, respectively reluctant to express their true opinion (Chart 4). An important fact is the reality that none of the respondents did not has an obstacle for foreigners living in the village. However, it is important to mention the fact that the Chorvátsky Grob has historically experienced with the presence and integration of foreigners, respectively Croatian community. According to the Croatian Cultural Association (2011) is in this village, like in the Bratislava district Čunovo, Devínska Nová Ves, Jarovce was recording their most numerous in Slovakia.

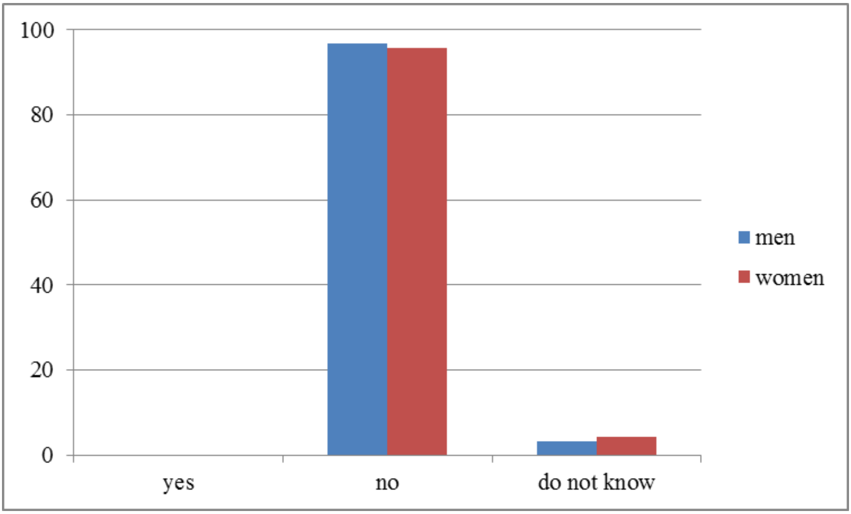


Chart 4: "Foreigners living in the village hinder me" (expressed in % by gender)
Source: Authors, field research

Through the following four statements were surveyed respondents' opinions on the ongoing integration of the expressions in the village (Chart 5). The first says "**The security in the village has fallen by the arrival of foreigners**" watching surveyed attitudes towards foreigners, as a possible threat of security breaches. Most (99%), disagreed with the statement, and foreigners do not see any potential hazards associated with development potential riminal activity.W ith the statement "**The arrival of foreignersh as changed the traditional nature of community life.**" Disagreed again 99% of respondents. This fact points to a strong Koreans community closeness who do not engage in the process and the overall development and changes in the way of life in the village. They commune for social outlet to Bratislava, or nearby Vienna. Also, their children attend private schools in Vienna, where reside in the dormitories, and therefore the inhabitants of the village during the week of no contact.

To reflect the answers to the following statement that "**Foreigners are trying to integrate into society (meeting the foreigners with the domestic population, communicating, developing joint activities...**)", where more than 94% of respondents confirmed the social distance of Koreans against the domestic population. The last statement "**To be affected by foreign cultures (architecture residential complex, exterior aesthetics of buildings, loss of traditional culture...) specifically interfere me.**" We watched a possible openness to indigenous people visible manifestation of another culture. Despite the fact that almost 90% of respondents would welcome the development the other cultural facilities in the village, up to 16% agreed and 9% did not express their opinion with that statement.

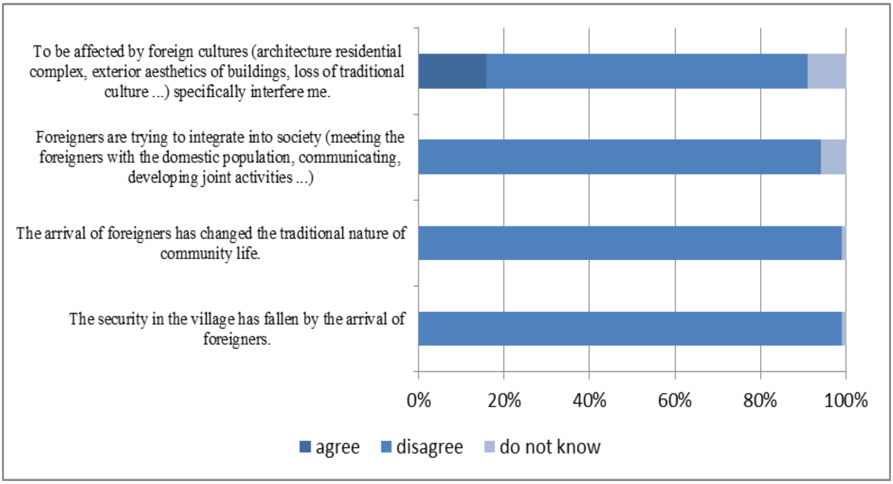


Chart 5: 'Have your opinion on the following statements..."
Source: Authors, field research

The disturbing element considered especially architecture residential complex, which impairs the overall look of the village with buildings dominating storey houses (Picture 1). Most respondents (75%), however, these symptoms do not interfere, since the bulk of the day spent away from home also and especially in Bratislava (primarily working, or just because of social and cultural activities).

Picture 1: Architecture of a Korean residential complex in uptown part of the Čierna Voda, traditional architecture in the old part of Chorvátsky Grob (left) and in the part of the Čierna Voda (bottom right).
Photo: Autors, field research

The last phrase "**Does the arrival of foreigner's impact to the quality of your life?**" The conative component focused on the perception of respondents (Chart 6). According to 93% of respondents did not affect the arrival of foreigners to develop their quality of life, which is related to segregated communities. The responses were largely influenced by the fact that during several years of Koreans staying in the area of interest, there has been no other cultural community development, which would lead to answers to the previous statements of the natives welcomed.

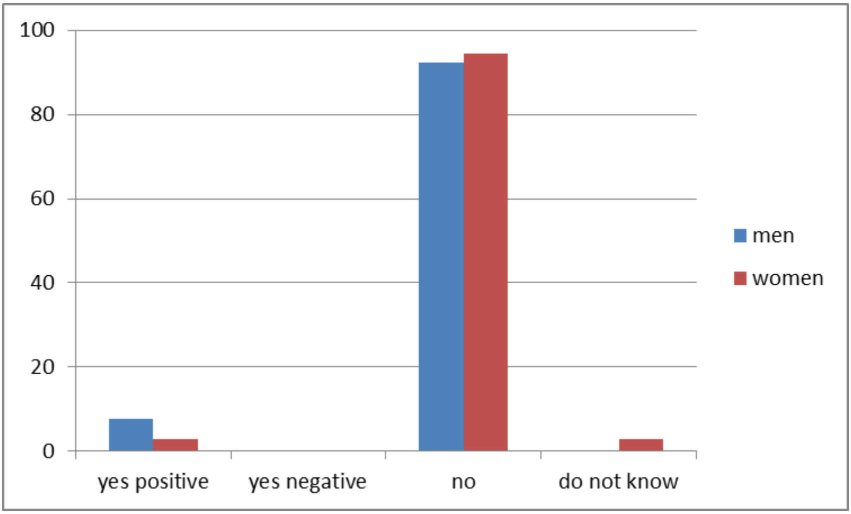


Chart 6: "Does the arrival of foreigner's impact to the quality of your life?"(expressed in % by gender)
Source: Authors, field research

Also, the vast majority of Koreans registered for temporary residence permit in the village, causes, that village lost to finance the general budget. Similarly, it is with the rest of the population in the village because of the Čierna Voda according to unofficial estimates, the MO Chorvátsky Grob lives nearly 1,000 people reported no permanent residence in the village. The remaining 5% of respondents answered that the arrival of foreigners recorded a positive change in quality of life. Their responses were related mainly filled with the completion of communication between the old part of the Chorvátsky Grob general and part of the Čierna Voda, as well as job opportunities that emerged with the construction of a residential complex and its maintenance.

CONCLUSION

Based on individual responses, we can conclude that the inhabitants of the village Chorvátsky Grob are open issues the formation of a multicultural society and are prepared to respect diversity. Accept the otherness and the presence of foreigners perceived as a natural fact of our times and against them do not feel any major preconceptions.

Even though most respondents said that they are not considered important and inspiring to know more foreigners living in the village, signs of their culture would be welcomed in the village. At the same time on their own experience foreigners seen as a smooth, friendly and decent community, which has equal status with the majority population. Their arrival at the same time did not affect the safety or reduce the traditional character of life in the village. Many respondents, Koreans in the village identified as a very close-knit community with a high degree of social distance, as indigenous people contacts with foreigners are that only sporadic. High community separation follows the opinion of several respondentsi in particular communication problem, because Korean women and children residing in a residential complex do not speak the majority language or another world language to a sufficient level of communication. Also, do not engage in social and cultural lifeo f the village, most free time is spent outside the village, especially in Bratislava and Vienna and in the community are present only in indoor complex. This is around the perimeter fenced and patrolled by security guards, creating an impression of space foreigners' ghettoisation in the community (Picture 2). As it revealed from the questionnaire responses, to according to the most respondents do not seek nor foreigners to integrate into the majority society. The village was not an increased accumulation of residential Koreans, which to some extent related to the temporary nature of their stay in our country (industrial conglomerates moving into areas with cheap labor, tax incentives, market moving, etc.).

Picture 2: The spatial separation of the Korean residential complex in Chorvátsky Grob – Čierna Voda
Source: Authors, field research

The contribution was prepared within the project UGA VII/4/2011 impact of labor migration of Slovak citizens in their living standards.

We thank for the cooperation to MO Chorvátsky Grob.

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Vnímanie integrácie cudzincov domácim obyvateľstvom na modelovom území Chorvátsky Grob – Čierna Voda

Integračné procesy a s nimi spojené sprievodné javy súvisiace so začleňovaním sa menšinových komunít do majoritnej spoločnosti, sú často vnímané domácim obyvateľstvom ako problematické až nežiaduce. Pre úspešnú integráciu cudzincov je preto nutné poznať subjektívne názory a postoje domáceho obyvateľstva k nim a k zmenám, ktoré ich integrácia so sebou prináša. Modelovým územím, na ktorom sme uskutočnili percepčný výskum bola obec Chorvátsky Grob, konkrétne jej časť Čierna Voda. Zamerali sme sa konkrétne na komunitu kórejských imigrantov a ich špecifické prejavy integrácie, ktorých zvýšený počet v tejto oblasti súvisí s ekonomickými aktivitami Kórejčanov na Slovensku. Na základe jednotlivých odpovedí respondentov môžeme konštatovať, že obyvatelia obce Chorvátsky Grob sú otvorení v otázkach formovania multikultúrnej spoločnosti a sú pripravení rešpektovať diverzitu. Akceptujú inakosť a prítomnosť cudzincov vnímajú ako prirodzenú skutočnosť dnešnej doby a voči nim nepociťujú žiadne vážnejšie predsudky. Podľa väčšiny respondentov sa však cudzinci nesnažia integrovať do majoritnej spoločnosti. Nezapájajú sa do spoločenského a kultúrneho života obce a v rámci obce sa zdržiavajú iba v uzavretých priestoroch komplexu. Ten je po celom obvode oplotený a strážený bezpečnostnou službou, čím sa vytvára dojem priestorovej getoizácie cudzincov v rámci obce. Viacero opýtaných považuje za najväčší problém spoločenského zblíženia sa jazyk a s tým spojené komunikačné bariéry. Prípadné formovanie multikultúrnej spoločnosti v obci Chorvátsky Grob bude preto závisieť aj od snahy komunity cudzincov priblížiť sa domácim obyvateľom najmä v tejto oblasti.

GEOSPATIAL PERCEPTION BY PEOPLE WITH VISUAL IMPAIRMENT

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Abstract: *Most of the information presented in the geography and geoinformatics are spatial data that can be expressed through plans and maps. For a significant part of users that are visually impaired, or completely blind, there are not available suitable products for presentation of spatial relationships and it is very hard to identify them in the text description. The solution is modern tactile cartography. Modern types of tactile maps are printed from the 3D computer model by 3D printers and can be colored for partially sighted people. It is also a unique method for multimedia processing, where can be located map sensors with executable soundtracks. The paper focuses on the use of this method in practice presentation of geospace and in education.*

Key words: *geospatial presentation; visually impaired; tactile cartography*

GEOSPATIAL PERCEPTION OF VISUALLY IMPAIRED PEOPLE

The geospace is either perceived by people directly through their senses or their perception is mediated via geo-information. Sensory deficit significantly impacts this ability. The best way how to present geospace to persons with visual impairment is a modern type of tactile maps. According to Růžičková (2009) optimizing cartographic tactile images from the perspective of tactile perception physiology is an essential prerequisite for their effective utilisation by these persons. In an ideal case, the resulting effect should also reflect in the integration of this area as a common part of spatial orientation and its teaching.

The perception of geospace is a prerequisite for everyday practical life anywhere on Earth, as well as for cognitive processes related to how natural and social phenomena (objects and processes) function. Those who are blind or visually disabled have to fight difficulties in perceiving geospace. It is the task of cartography to provide these people with suitable devices to perceive and study geospace.

Visually disabled people constitute a relatively large group. The British Royal National Institute of Blind People (RNIB) estimates that the share of visually impaired people could be 1.5–2 % of the world's population. A visually impaired person is a person who keeps having problems with their eye-sight in their daily life even after vision correction (Růžičková, 2009). For persons with visual impairment, one of the first important steps on the way to spatial cognition of the space around us is most certainly mediation by another person’s perceptions. It is the task of cartography to provide these people with suitable devices to perceive and study geospace.

TACTILE MAPS

The first modern tactile maps coming from the 1980s served for practicing orientation in space and independent movement and contained primarily line representation of people’s movement routes in their daily life. They were made of embossed foils produced by special vacuum printers. However, these maps served as a mnemonic aid rather than a tool for the presentation of geospace.

Only relief maps primarily designated for people without any visual impairment could be considered an actual approximation to real space. These gave the sense of the Earth's surface topography to blind people but were not able to provide further geographical information. It is task for modern 3D cartography to provide a wide selection of publications with geographic information, including top-quality tactile equivalents of national atlases.

MODERN 3D TACTILE MAPS

The new type of 3D tactile maps is created according to the needs analysis of blind persons and persons with a visual impairment. During realization of project *Perception of Geospace by Modern Tactile Maps* at Palacký University in Olomouc, all general principles of processing tactile maps have been followed, i.e. overall slipperiness of the surface, no health hazard, wash ability, etc. Sample maps are focused on different cartographic methods of presenting geospace. There is an example of cartogram (unemployment in the Czech Republic), hypsometric map (hypsometry of Europe), a plan of a small locality (centre of Olomouc city) and multi-media state map (UNESCO monuments in the Czech Republic).

Print software divides three-dimensional computer models into thin layers. A layer of gypsum powder is placed in the corresponding printer compartment; the thickness of the power is determined by the thickness of the calculated layer. A special adhesive agent of a required color is applied over it, but only in the place of the image. Tactile maps designated for the visually disabled have a special color scheme, so that they can be used by the people with visual impairment. The selected colors have a high contrast, so that they are easily distinguishable by sight.

Fig. 1: Cartogram in the form of modern 3D tactile map

TESTING OF MODERN 3D TACTILE MAPS

In cooperation with people with visual disabilities there have been done instructions for creating a modern tactile map composition as well as a catalogue of tactile maps' geovisualization methods made up in touch with experts on cartography. All created maps were tested by persons with visual impairment. On the basis of testing, responses by 51 respondents were acquired (11 adults and 40 primary and secondary school pupils). Of these, 31 were blind (7 adults and 24 pupils) and 20 had visual impairment (4 adults and 16 pupils). The responses of primary and secondary school pupils usually corresponded with the statements of adults. It means that the touch of primary school pupils from class 6 onwards is developed in a similar manner as that of adults.

During the testing of these new tactile maps we took into account the time, and the experience and age of the persons tested. The majority of negative comments were related to the fact that no similar maps had been available in the Czech Republic and the users were inexperienced in working with the new tactile map. The map key and contrastive colors which facilitate orientation to the people with visual impairment were evaluated as beneficial. The users' comments were used to re-create all sample 3D tactile maps. Maps were appraised especially by the teachers of visually disabled students because no other alternative existed up to now.

CONCLUSION

There is an increasing need of tactile maps because of increasing integration of the visually disabled into daily life. Modern 3D tactile maps are unique in terms of the technique used. It is clear that spatial orientation and mobility development is impacted by several factors. Elaboration and easy use of these new types of tactile maps can be one such factor.

Up to now, geospace was presented to the visually disabled usually via pressed foils and plastic embossed maps. However, these are primarily designated for people with no visual disabilities and are only able to provide information about the segmentation of the Earth's surface to the visually disabled, not about the distribution of geographical information and other spatial information. Modern type of 3D maps is suitable for geospatial perception by people with visual impairment and it is the responsibility of the author of geographic analysis to allow the presentation of results in this way.

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Prezentace geoprostoru pro nevidomé a slabozraké

Většina informací prezentovaných v oblasti geografie a geoinformatiky jsou informace prostorové, které je možné vyjádřit prostřednictvím mapy. Pro značnou část uživatelů, kterou představují osoby slabozraké nebo zcela nevidomé, jsou však běžně dostupné kartografické výstupy bezcenné, avšak textový popis ne vždy umožňuje uživateli vnímání prostorových souvislostí. Řešením jsou 3D tyflomapy moderního typu, které jsou tištěny z 3D modelu na speciálních tiskárnách a mohou se obohatit o barvotisk pro slabozraké, ale také o unikátní metodu multimediálního zpracování, kdy jsou do mapy umístěny spustitelná čidla se zvukovými stopami. Příspěvek je zaměřen na využití této metody prezentace geoprostoru v praxi a ve vzdělávání.

GEOINFORMATICS IN SUPPORT OF SIMULATORS TRAINNING

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Abstract: *Two differently looking technologies, constructive simulation and geographical information systems (GIS), are operated together in the Centre of Simulation and Training Technologies (CSTT) of the Czech Armed Forces. The simulator, being the main tool to achieve the goals of the Centre, cannot be provided without terrain databases. Indeed, these are managed using the GIS tools. Vice versa,* *the analysed results obtained from GIS are verified within the simulation. In this article, examples of interconnection between these technologies are presented. The aim is to provide a description of advantages of using GIS to transform a digital model of a territory to a terrain database in relation to basic military features of the environment. As another example of a successful combination of both technologies, we present solution for deploying armed forces inside the Czech territory during an unusual event and following verification of analysed results within constructive simulation.*

Key words: *GIS, simulation, terrain, analysis, CAX*

TRAINING ON THE CSTT

The employment of simulation technologies used for training troops has gone through a long tradition. Especially nowadays, when widely developed computer technologies and electronic systems are being increasingly utilized to facilitate greater accessibility of simulation technologies. These transformations have influenced the Czech Armed Forces in the same way. The centre of simulation and simulator technologies (CSTT) in Brno provides these facilities and trainings for the Czech Ground Forces.

Combat operations

The training at CSTT with the use of constructive simulation was set up in 2000. Since then, the system has been operating to train commanders and army staff in leading combat actions. Growing experience with the preparation and implementation of CAX (Computer Assisted Exercise) expanded the potentialities of training offered to CSTT costumers. Parallel trainings of two battalions, out of which one was mechanized (underserviced) and one specialized, were gradually introduced. The first training of a brigade, which was an exercise test of the capacity and technical capabilities of CSTT, took place in 2002.

Operations other then war

As the world is becoming more and more globalized, the world's actual threats are changing, and therefore, the tasks and determinations of armed forces are undergoing changes accordingly. As a consequence, the methods and design of trainings must be adjusted. For these reasons CSTT initiated a testing of constructive simulation systems for training troops in non-combat situations in 2004. When the Czech troops were deployed on KFOR operations, the utilization of the simulator and new forms of CAX were adjusted to suit the needs. Models of civil persons, vehicles and animals together with models of their behaviour were implemented into the simulators.

The experience with training of units before KFOR deployments are taken into account even with units that are preparing for ISAF using simulations and simulators. One of the greatest assets of these exercises except the checking of standard operation procedures, co-ordination within Headquarters and the checking of the appropriate bindings within the contingent is a familiarization with the training environment. It is not only about setting the scene of the behaviour of local inhabitants and their culture during the simulation, but also a simulation in the real environment of the country where the unit is supposed to be deployed. By utilization of a terrain database of the actual territory, casual officers and headquarters acquire fundamental information about the terrain, the travel distance, critical points etc.

Crisis management

Besides the training of combat and non-combat operations, a constructive simulation for the training of crisis management has been extensively used. This is the reason why the Czech Army consists of specialized units appointed to tasks concerning Integrated Rescue System and natural and industrial disasters. These units are supplied with equipment and special devices that are very similar to fire-fighting, sappers and chemical equipment. The local inhabitants, variety of specific constructions and objects and many other entities, including industrial chemical substances and their influence, were set up in order to create the required scene. New tasks included digging soil and other materials depending on the subsoil, the ability to employ gas-proof coverall, decontaminating persons and equipment, searching of debris by persons and dogs, handling weights facilitated by persons and special equipment etc.

The system adjusted in this manner aiming at trainings of critical situations is employed two or three times a year. The participants of the rescue unit trainings include firemen, policemen and university students studying subjects focused on crisis management.

TERRAIN DATABASES

Majority of simulation tools require data about terrain in some form for real time and space simulation. Constructive simulation system OTB (OneSAF Testbed Baseline) employed for training in CSTT is such a tool. Apart from the tactical-technical data of individual entities (vehicles, aircraft, combat systems, persons, animals etc.), OTB also demands terrain databases for its operation. A terrain database in a simulator is a set of geographical information transformed to reflect the links and relations between individual objects of the real environment and its entities.

Creating terrain databases

Although it would be possible to create a fictional terrain just like in a computer game, the trainees' supervisors require real terrain training as real regions have been topographically charted and thorough maps are available for detailed planning of all actions. Following this requirement, terrain databases of various regions in the Czech republic and other foreign countries have been created based on most elaborate and detailed digital geographical data. The fundamental data model is DMÚ 25 supplemented with aerial pictures and other sources of data. These data provide sufficient information for creating following layers:

- Relief – altitude model layer;
- Woods – vegetation impassable for vehicles;
- Brushwood – passable vegetation, restricted visibility and decelerated passability;
- Water – spacial water, passable by swimming, wading or on the bridge;
- Rivers – linear water, both passable and impassable;
- Roads, paths, railway – categorized road network layers;
- Buildings, alleys, trees – objects in these layers mainly influence visibility and passability, might be circumvented.

First databases were created with layers of terrain reliefs in GRID format. Nowadays the GRID format is being replaced with irregular triangular net. This representation of terrain in TIN format is more precise primarily due to qualitatively better computational technologies. The transition to TIN representation of terrains enables implementation of surface layers into the databases. The surface in the databases is not depicted by various soil types but by substantial types of surfaces such as the following:

- Paved asphalt or concrete area; clayey path;
- Deep water;
- Sandy surface etc.

Each of these layers defines a set of established parameters that depends on simulated meteorological conditions. Different weather setting determines completely different mobility behaviour of the simulating entities.

Fig. 1: 2D and 3D visualization TDB Logar

Foreign TDBs are based on data received directly from troops operating in given areas, sources in NATO, data MGCP, or data obtained by vectorization of topographic maps and satellite pictures.

Characteristics of terrain databases

Terrain influences behaviour of military troops at all kinds of actions. Therefore, it is inevitable to display the terrains in the simulators as authentically as possible and sustain the basic patterns and relations between individual terrain layers, not only among terrain elements but also between terrain and entities (vehicles, persons etc.). Terrains displayed in the simulators must meet a number of requirements. The basics is:

- Illustration of the battleground status – provides the commanding officer with the information about subordinate vehicles and persons, neighbours, oponent/enemy and their distribution in the area.
- Materials for planning and running the operation – based on knowledge of the troops, terrain characteristic, etc. This enables planning further actions.
- Passability model – influences behaviour of each entity (vehicle, person, missile etc.) and their mobility in the given area.

– Environment for the gunfire observation and control – 3D visualisation affects hidden movement, surveillance of specific areas, accuracy and efficiency of gunfire and many similar phenomena.
– Data for modelling dynamic effects – influences the spreading of smoke and toxic substances.

Even the first employment of simulator in the training proved that it is not possible to treat TDB as a GIS or cartographic model. An example of an essential and necessary modification of data in DMÚ 25 is creation of forest corridors. On a topographic map, or in DMÚ 25, there is an object representing forest with a road crossing the forest. At first glance it is clear that this forest can be walked around or gone through following the road. In case of analysis of the optimal route in GIS environment, the analysis is run either directly in the road network or in the terrain but there is always a possibility to follow the road. However, there occurs a paradox when a vehicle moves in the simulator: If the commander chooses the road, the vehicle keeps moving until it reaches borderline of the forest. At this spot the vehicle stops, as the setting does not allow any vehicle to pass through the forest. The vehicle either starts searching for a detour, or remains there. Of course, there are not any real trees on the road or the vicinity but the width of corridors is usually insufficient and DMÚ does not consider it. This is the reason why corridors must be created alongside the roads in the layer of vegetation.

ANALYSES AND SIMULATION

Apart from creating TDB, in CSTT the geoinformation technology and digital geographic data are used for the purposes of terrain analysis within the CAX preparations and for experiments.

Analyses of terrain

Analyses of terrain are an inherent part of the preparations of most exercises. Based on the kind of exercise, various analyses of terrain take place during the CAX preparations. Here are the simplest and most fundamental analyses:

- Search for optimal routes of movement depending on carrying capacities of the bridges, capacities of the roads and streets, arrival time etc.
- Choice of observation points for the purposes of surveillance;
- Search for safe air strike line;

- Optimalization of distributing communications equipment for cover are;
- Determination of endangered areas during toxic substances leakage;
- Defining landing areas for helicopters.

Besides these particular analyses, also their diverse combinations are performed depending on given exercise. Some analyses are necessary for combat operations, some for preparing troops for foreign missions and other for training rescue forces.

Connecting GIS and simulator

Connecting GIS and simulator is not a self-evident matter. The first prerequisite for such a connection of these technologies is making use of geographic data localized into one region thank to one coordinate system in both cases.

Tab. 1: comparison time from simulation again time from GIS

Garrison	Time [min]							Distance [km]	
	GIS	**øS**	S1	S2	S3	S4	S5	across town	total
Žatec	**99**	**145**	126	142	166	158	133	21	92
Podbořany	**88**	**139**	139	130	163	129	134	16	85
Zbiroh	**143**	**195**	175	184	212	207	197	24	135
Rakovník	**110**	**176**	148	197	184	171	180	18	105
Jince	**165**	**212**	198	231	203	220	208	29	154

As an instance of interconnection of these technologies, it is possible to present the analysis of capabilities and competences of soldiers and engineer equipment in the region of Karlovy Vary within IZS. [3] GIS technology assisted in determining the optimal route for the engineering convoy from selected bases regarding the carrying capacities of the bridges, establishments and other parameters. The transfer of the vehicle was simulated within the environment of constructive simulation. During this simulation all the characteristics and effects of terrain were being considered and that is why the vehicles tended to decrease their velocity when they were going uphill, turning sharply or passing a crossroads. The only factor that cannot be taken into account during a simulation is the expertise of individual crews. However, it is not negligible how much influence brings the expertise of actual operators who run the simulation. And even with many repetitions of the same simulation, the simulator cannot reach the same time. This is the reason why the simulation ran repetitively with different operators and as the result time was chosen the average time. The findings clearly show that the time for transfer computed by GIS and the real time vary significantly, as the real time was approximately 50% longer.

Another example of connection between GIS and constructive simulation illustrates the possibility of displaying the outputs of analyses of spreading a flood wave in the environment of constructive simulation. A project in defensive research was dealing with physical interconnection of various analytical tools and their outputs into the environment of constructive simulation. The goal was to expand the potential and quality of the exercises. One of the inputs was the analysis of flood wave spreading. To be able to model the behaviour of the water masses, a scenario of burst dam was chosen, as there existed a suitable mathematical description. [2 and 1] In the GIS environment all the computations were performed and resulted in a creation of a raster model where every pixel was given values of arrival of the wave, time of the flooding, maximum height of water etc. These raster layers then periodically generated polygons of flooded areas in the given time. During the simulation these areas are transferred into the simulator as a layer and every operating station is updated with the currently flooded areas. On this principle it is possible to evaluate the actions of the intervening units during the training and thus draw nearer the exercises on the simulator to the real rescue missions.

CONCLUSION

The above-mentioned examples clearly show that geoinformatics plays an unparalleled role in the training with simulation technologies. No other tool can substitute for all the possibilities it offers. At the same time it has been proving to be of significant importance in the CAX preparations since geoinformatics contributes to high-quality events as well as elaborate means of evaluation.

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Geoinformatika při podpoře výcviku na simulátorech

Armáda České republiky (AČR) využívá již řadu let pro potřeby výcviku na všech stupních velení simulační technologie. Simulátory a trenažéry pro svou činnost vyžadují kromě taktických a technických dat techniky a zbraňových systémů i geografická data. Z těch se především generují databáze terénu pro jednotlivé virtuální simulátory a systém konstruktivní simulace OneSAF. Každý simulátor je tak do jisté míry zjednodušenou podobou geoinformačního systému, který na základě předem definovaných algoritmů, aktuálního chování simulované entity, povětrnostních podmínek a dalších vlastností, vyhodnocuje a řeší vazby simulovaného modelu (entity) na terén. Každá entita v průběhu simulace v reálném čase vyhodnocuje své možnosti pohybu, pozorování, vedení palby apod. Kromě tvorby terénních databází pro simulátory je geoinformatika na Centru simulačních a trenažérových technologií využívána v rámci přípravy jednotlivých cvičení a při tvorbě analýz terénu na podporu rozhodování či pro vytváření rozeher. K těmto činnostem jsou využívána geografická data z území ČR i z oblastí nasazení jednotek AČR a to především z armádních zdrojů (DMÚ, DMR, MGCP, VMap, DTED, letecké a družicové snímky, …), které jsou doplňovány o běžně dostupné zdroje dat z internetových mapových služeb.

NEW TRENDS IN GEOINFORMATICS: EYE-TRACKING, RIA, CLOUD-COMPUTING

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Abstract: *This paper summarizes the latest technology used in geoinformatics and digital cartography. The newest trends in publishing cartographic outputs on the internet are solutions based on the concept of RIA applications. RIA (Rich Internet Application) is a Web application which brings tools and practices from desktop to Web application. It provides greater user experience for users and for professionals as the creators of applications also. The paper is also focused on implementing eye-tracking* *technology, which tracking eye movements, for GIS applications. Eye-tracking can significantly increase the usability of applications and maps, for example tracking the most common areas of interest (so called "heat-maps") and subsequent adjustment of application or revolutionary technology for control map applications only by sight, without the use of locomotive apparatus. This is an innovative way to create, control, and completely objective evaluation of map outputs in both analog and digital creation. The combination of eye-tracking and RIA brings a new approach in geoinformation systems. Applications based on RIA technology called Flex and cloud-computing model will gradually gain a majority in the application of geoinformatics. Release Flex as open source, which brought widespread in the field of GIS, is bringing totally new possibilities of visualization. The most widely used is Flex client ArcGIS Server, by Esri, based just on cloud-computing model. In the cloud-computing approach are all priorities placed on servers in the "cloud" and user practically does not need "physically available" data or program in the computer.*

Key words: *Eye Tracking System, Rich Internet Applications, RIA, Flex, Cloud-computing*

INTRODUCTION

Today we live in the time, where modern technologies are all about us, in every field of study. This paper reviews recent trends in geoinformatics and internet cartography and explains how an Eye-tracking system, RIA (Rich Internet Application) concept and cloud-computing can add new approaches in near future. The traditional approach of providing and working with GIS (Geographic Information System) still has numerous limitations, especially connection with data and programs which user need "physically" saved in own computer. Common trend is relocation and distribution both data and programs on the Internet as services, which is allow by cloud-computing and RIA. On the other side the newest technology used in GIS is implementation Eye-tracking devices for design, evaluation and control specialized applications. There is a big potential for using it on a large-scale.

EYE-TRACKING

Eye tracking is the methodology of measuring and recording the eye movements relative to the head position of an observer or that of capturing the gaze on some visual scene. Eye tracking system is a device for measuring eye positions and gaze movement ("where we are looking"). The meaning of visual scene is wide and it is possible to be related to an analog product (e.g. image, poster etc.) or to a digital product (web page, digital map etc.) that is depicted on a computer screen or projected to a flat surface by an appropriate device [2].

There are a number of devices, methods and outputs, but currently the most widespread and commercially available method is to use infra-red illumination of the eye and infer gaze direction by comparing the position of the pupil relative to the position of corneal glint (that is, a spot of reflected light from the cornea that exists whenever there is enough ambient light to see) [4]. The most common outputs are "heat-maps" of intensity and/or time and some records of eye movements. Simplified version of "heat maps" is the time-line with temporal aspect – where person is looking first, at second step, then, and then… The methods are based on the generation of an electromagnetic field that is placed around the eye (electro-oculography) and use of a special type of glasses. However, the technique that has been dominated, mainly due to its direct application, is based on the use of devices that are able to record the gaze on the visual scene analyzing eye images. There is a project at Department of Geoinformatics at Palacky University about an Eye Tracking System focused on these fields.

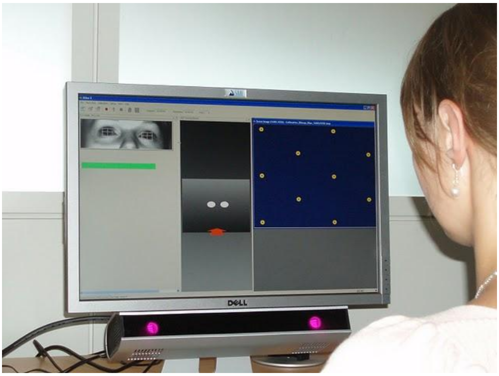

Fig. 1: research on Eye-tracking device

CONTROL OF WEB MAP APPLICATIONS BY SIGHT

The Eye-tracking device allows contactless control map applications on the screen without locomotive system. The aim of research is to localize by heat-maps the best distribution of control tools for movement with map (function "pan"). It can analyze how sensitive are people on perception of control tools in different web pages and platforms. It is a great experience to compare accurate survey data with personal interpretation and knowledge. Based on these results is the next step – design of "control tools" which is command by eye-tracking device. There has been elected rectangle areas located on the edge of map (AOI - Areas of interest), with special function which have defined some time delay. When user localizes one of these areas the map automatically moves to the way on which edge is localized on, and time delay prevents accidental movement. The technology for recording the eye movements on the screen offers this option, because if you properly define the layout and function controls of the map, you need connect these two systems only. But there is some technical constrain also. The solution of movement control is based on data transmission between eye-tracking-device-output and converter in real-time. Unfortunately just real-time transfer is not supported in every case of SMI (SensoMotoric Instruments Company) devices, on which are research made on. More precisely it is the problem with money, because eye-tracking device and every upgrade is really expensive.

RICH INTERNET APPLICATION (RIA)

The last trend in the publishing and the subsequent work with data and Internet outputs are solutions based on the concept of RIA. It is a Web application that brings the tools, practices and conventions from desktop platform into interactive web applications for everyone and everywhere, providing greater user comfort. It requires a special environment, for transmission of client requests to the server. In principle it is a web application which is not strictly based on traditional request / response paradigm. Classic current Web site, are created on the client side (X)HTML code, which is directly interpreted by a web browser. Every interaction with such "classic" side of it means sending a new request to the server, which returns a response code in the form of a new site. It is not necessary at the RIA concept [6], [8].

There is number of RIA technologies like AJAX, Silverlight, Openlaszlo, JavaFX etc., but the most used one for GIS is called Flex, through which you can build highly interactive web map applications [3], [5]. Adobe Flex, spread in 2007, is a framework that allows you to create RIA applications that are compiled into the same format as Adobe Flash and runs in the same runtime environment, but Flex is very different from Flash! Flex takes from Flash only the best features - runtime environment, programming language ActionScript and tries to add new features, but on the other side, it is a open-source project, create applications is aimed at developers rather than the graphics, etc. [5] The leader in GIS software, Esri company, developed own Flex client work with ArcGIS. It is free, ready-to-deploy application for ArcGIS Server, which is designed for developers that want to customize the appearance, functionality, and content of their mapping applications. There are wide possibilities to enlarge by lot of widgets and/or XML configuration files, which enable easy customize [3]. In fact application based on RIA look like desktop application and provides desktop functions, but in fact it is pure web application, which can be extra located in cloud also. Using RIA framework gives powerful tools for another development and open new ways to support next step in GIS revolution and today it is high-end level of web map application.

Fig. 2: ArcGIS Viewer for Flex

CLOUD-COMPUTING

Cloud computing is model based on the principle of the development and use of computer technology through the Internet. It can be also characterized as providing services or programs stored on servers on the Internet with the fact that users can access by Web browser or application client virtually anywhere all over the world. In fact user exactly do not know where data and application are placed, everything is placed “somewhere in the cloud - somewhere on the Internet”. Users pay for service, for using, not for own data or software [7]. Offer applications ranging from desktop applications through systems for distributed computing, to online operating systems in browsers. Cloud computing introduced for example Apple Company as iCloud, similar with focus on spatial data is GIS Cloud. This service allows visualize, analyze and share geo-data for free over the Internet. The data can be connected to Google Maps and Bing, as well as the OpenStreetMap. Using the API you can also create custom applications using powerful computers connected to the "cloud". There are also applications for mobile devices running Android software for field mapping and direct data transfer to GIS Cloud. In addition to large number of public functions of GIS Cloud allows use services for internal purposes of individual companies in secured private section. With this way is possible share private spatial data and analytical tools anytime and anywhere. Just this approach has big potential and gradually will replace present style of working with geospatial information. Great advantage is that cloud supports every used format. There are three cloud service models [1]:

- **Software as a Service (SaaS)** – users buy only access to the application, not the application itself

- **Platform as a Service (PaaS)** – the provider provides whole platform for creating custom application with fully available services
- **Infrastructure as a Service (IaaS)** - the provider provides the hardware and technology, typically as virtualization

ArcGIS users and developers can access ready-to-use maps including imagery, topography, and street base maps as well as task services such as routing and geocoding. ArcGIS for Server can be deployed in the Cloud via the Amazon Elastic Compute Cloud (EC2). According to Esri [1] also mobile GIS services are coming to the Cloud soon so that an organization's field staff, business professionals, and consumers can access GIS capabilities and data using nearly any mobile device.

CONCLUSION

This paper assesses possibilities of implementation absolutely new geoinformation technologies especially with the focus on RIA concept, Cloud-computing and Eye-tracking. Solution based on the concept of RIA application in cloud-computing environment is new trend of processing and publishing GIS outputs and brings the tools, practices and conventions from desktop platform into interactive web applications, providing greater user comfort. Due to Eye-tracking device it is possible to evaluate which applications are the most attractive and why. Like in other revolutions that happened with the digital media, the only one question is the time, respectively the price. In some years, when Eye-tracking devices will be cheaper, we will use it every day.

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Nové trendy v geoinformatice: eye-tracking, RIA, cloud-computing

Příspěvek shrnuje nejnovější technologie užívané v oblasti GIS jako koncept RIA aplikací, konkrétně Flex, distribuovaný přístup k datům a programům zvaný cloud-computing a technologii eye-tracking, tedy přístroj pro sledování pohybu očí a jeho možné užití pro bezkontaktní ovládání map. Kombinace těchto technologií přináší nový směr do oblasti geoinformačních systémů.

GEOINFORMATION TECHNOLOGIES IN ORGANIZATION OF MOUNTAIN BIKE RACES

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Abstract: *This paper completely assesses problems of implementation geoinformation technologies for organization mountainbike competition. This paper completely assesses problems of implementation geoinformation technologies for organization mountainbike competition. Today is common record tracks by the GPS device and later upload data on the specialized web map applications. But professional athletes have different requirements. GPS tracking localize their current position in real-time and transmit to the database. It is possible to use it in many kinds of sports, such as cycling, orienteering, sailing, cross-country skiing, running, automobile racing or football as well. This paper shows how GPS tracking can bring advantages for wide range of professional sport.*

Key words: *GPS tracking, sport, professional, location-based services*

GPS TRACKING

The location-based service gives the user geospatial information, where geospatial means that it is based on the current geographic location. In every fields of human activity, including leisure-time activities and sport, is possible to localize position in and tracking the movement. The sport gives us great opportunity to implement modern technologies such a LBS and make some scientific research, because in every kind of sport we can analyze some movement of athletes [1],[5].

There are a lot of advantages why tracking athletes – analyze and evaluate their training, locate their position in unknown surroundings, protect their safety or increase attractiveness of TV broadcast. The principle is precise location of athletes by GPS sensor and consecutive data transmit into spatial database. Data can be transmitted by WiFi, GSM, SMS or modem in real time, which allows displaying position of athletes in real-time on screen [1]. Loggers have internal memory, which allows downloading data from device later into computer. Only one restriction is usage GPS trackers only outdoor, because today is still not steady indoor GPS device.

The field of tourism is the most widespread and the first usage GPS tracking in leisure-time activities. According [2] the main reason for use it in tourism is "Benefit from the use of mobile technology that provides new services to travelers on the move. In fact, the supply of mobile services with specific relevance to the traveler has been developed rather well. The primary functions of LBS for tourism are usually regarded as being the localization of persons, objects, and places, routing between them, search for objects in proximity such as restaurants, shops, hotels, or points of interest, and information about traveling conditions, such as traffic-related data" [2]. In current years GPS tracking is more and more implemented in all kinds of sport. It is integral component of present sport activities all over the world.

CYCLING

A lot of cyclists use everyday GPS receiver, but for professional riders is beneficial only connection with the speedometer, cadence-meter, heart-rate monitor and power-meter. Only comprehensive data obtained from all these sensors allow professionals to fully analyze their training. The itinerary can be evaluated in the numerical statistics in a graphical time record, including tabular information on all measured variables for every moment. Specialized devices by companies Garmin, Suunto or Polar are used in Pro-tour races, especially Finnish company Polar [3] is a world leader in heart-rate sensors.

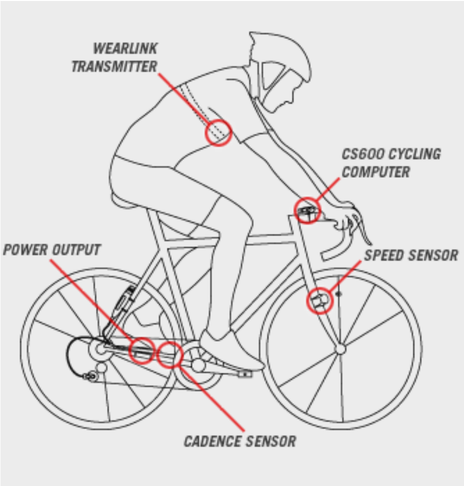

Fig. 1: The sensors used in professional cycling [3].

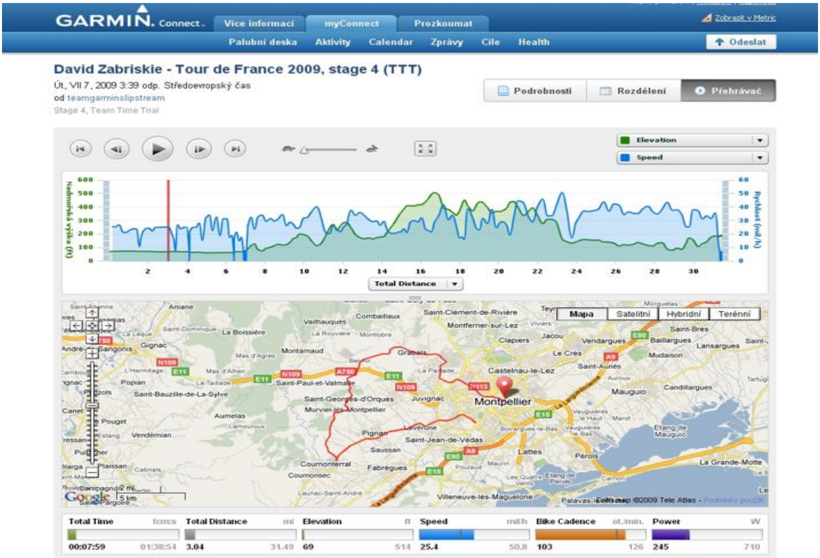

Fig. 2: Visualization of telemetry data, David Zabriskie 4th stage of the Tour de France 2009 [6].

Some devices allow the virtual training partner [8]. The device can load another file (race of opponents, own race from last year …) and the device shows deviations from the trajectory and time of the virtual opponent. With synchronized video which is displayed at the same time with satellite images, you can simulate a real race track. Today is possible download every outputs from team websites and simulate route at your home.

Already an established attractive technology is GPS tracking (sometimes called TracTrac) with real-time visualization on TV screen. Competitors are localized in real time using the GPS chip and simultaneously are their position display on the TV screen. In addition to TV broadcasts, the technology is being widely used in stage races (Tour de France, Giro d´Italia, Vuelta de Espana), where visitors have opportunity to watch events on the big screens around the track or in TV at home. Competitors receive sensitive GPS sensor which capture data and stores it on SIM card. Then are data send via GPRS to a central server, which graphically displays the actual position of the rider on the screen during live the races [3]. The only technical restriction can be dense forest, which eliminates the signal from satellites, but it is a minor disruption which takes only a few seconds, so on the screen is still possible compare leaders. In some special events it can be link combined with a video camera sees from helmet´s camera.

GPS tracking for the "biggest" races is used since spring 2008, where was first time used at Giro d´Italia. During the Tour de France 2010, this technology was used for the first time such a general classification in real time. But it is necessary to say, there are some special occasions, when it cannot be considered 100% reliable. For example 3.stage of Tour de France 2011, when Lance Armstrong had 3 defects in a single stage. In the case of emergency, riders with no ambitions give own bike to the captain, so Lance Armstrong rode more than one bike during a stage. In all cases technology of GPS tracking is very attractive for fans [5].

Very new issue for the future is a discussion about using of GPS locator for doping control. Athletes should have placed the GPS chip under the skin (more realistic option would be backpack or helmet). Probably in near future GPS receiver will be built-in into bike's frame, for better monitoring during the race and location in case of theft [3].

Fig. 3: GPS tracking – yellow dot indicates position of Maxime Monfort during the 2nd stage of the Tour de France 2010 (brown, gray and blue dots indicate other racers) [7].

OUR SOLUSITION

Usually there is a main page, where user can choose track by searching by the name or by localization on the map. On the page with track there are ussualy general information about the track, altitude profile and of course the map. Almost every examples of these servers are based on Google Maps API. On the other side professional riders use GPS with sportester (heart-rate sensor) and wattmeter (power sensor) for analysis their track. On the biggest world races like Tour de France or Giro d´Italia we can see monitoring riders in realtime nowadays, this technology is known like Track Track.

The main aim was to made an aplication for organizators bike competition. It is dividend into two parts, in the first one there are 15 tracks of “Kolo pro život serie“, with general information about these tracks and in the second part there is track of exhibition “Pražské schody“, with many special functions, like interactive profile and itinerary, animation, video, weather, searching etc.

There was some constrains during the programing of application, for example with narrow editation of polyline and polygon layers, with displaying in the Internet Explorer and validation etc. For using aplication without troubles it is better to use other program then Internet Explorer, for example Mozilla Firefox, Chrome or Opera. The whole application is fully ready for use and you can find it on the webpage about this work (see URL: http://gislib.upol.cz/app/netek10/).

CONCLUSION

This paper gives an overview how are GPS tracking and location-based system used in sport today. Because it takes a long time, from the first usage by professionals to spread to the public, is more relevant be focused only on professionals. LBS are implemented in wide range of sports, both of individual and collective sports. There are specialized GPS tracking technologies and applications in sports such as cycling, orienteering, sailing, cross-country skiing, running, automobile racing or football and tennis as well. Field of sport and leisure-time activities provide a great potential for other implementation of location-based services to the future. It is obvious, that modern (geo)information technologies will play important role in field of sport in future as well. Generally we can say that it brings only the advantages for athletes and fans - it increases safety and attractiveness. Today are location-based services the integral part of sport already.

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Implementace geoinformačních technologií pro organizaci závodů horských kol

Na počátku realizace této práce byly na základě zadání stanoveny základní cíle. Stěžejním cílem bylo vytvořit internetový mapový portál, sloužící pro organizaci závodů horských kol. Tento portál by rozdělen do dvou samostatných částí. V první je zaznamenáno 15 závodů seriálu Kolo pro život s informacemi o trati, možností zobrazení profilu, lokalizace pozice návštěvníka atd. Vedle pouhého prohlížení tratí jako divák je zde k dispozici propracovaná administrace, která zaručuje aktualizaci a nezávislost na autorovi práce. Druhou částí je modelová aplikace atraktivní exhibice Pražské schody. Ta je vedle základních informací o trati doplněna interaktivním profilem propojeným s animací, itinerářem, videem, počasím atd. Během programování se vyskytlo několik překážek, jako např. omezená editace kartografických metod u linií a polygonů, nekorektní zobrazení v Internet Exploreru s čímž souvisí problematika validace. Nakonec byla zvolena varianta demonstrovat co nejširší funkcionalitu a beze zbytku tak splnit zadané cíle na úkor drobných formálních nedostatků, což však lze eliminovat použitím jiného prohlížeče než je IE.

WINTER ROAD MAINTENANCE IN URBAN AREAS USING NETWORK ANALYSIS IN GIS

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Abstract: *Nowadays the minimization of costs is necessary in all logistic processes. The paper deals with minimizing of the costs for winter road maintenance with optimizing vehicle routes using the tools available in GIS. It was chosen few areas of interest (regions) from the plan of winter maintenance according the different spatial and road diversity in each of areas. The present routes were optimized. The critical factor was the total length of compared routes – the present and optimized one. The results show that there is the potential for shortening of routes and using GIS for this type of task.*

Key words: *Winter road maintenance, GIS, Network analysis, optimization*

LAW BACKROUND

The winter road maintenance organization is carried out according to the operational plan of winter maintenance, which is based on Law No. 13/1997 Coll. and Law No.104/1997 Coll.

This legislation divides communications into three main categories according to the order of importance:

Ist category of communications – speed and local collection roads with public transport, access roads to local medical facilities and other major local roads

IInd category of communications – collecting local roads not included at Ist category and important local communication service

IIIrd category of communications – other local service communications

Unkempt communications – local communications, where is no need to carry out winter maintenance due to low traffic significance

Responsible for winter maintenance of local roads (Ist, IInd and IIIrd category) is a municipality. The deadlines for winter maintenance of each category are:

Ist category of communications – up to 4 hours

IInd category of communications – within 12 hours

IIIrd category of communications - after the finishing of treatment of Ist and IInd category of communications, no later than 48 hours.

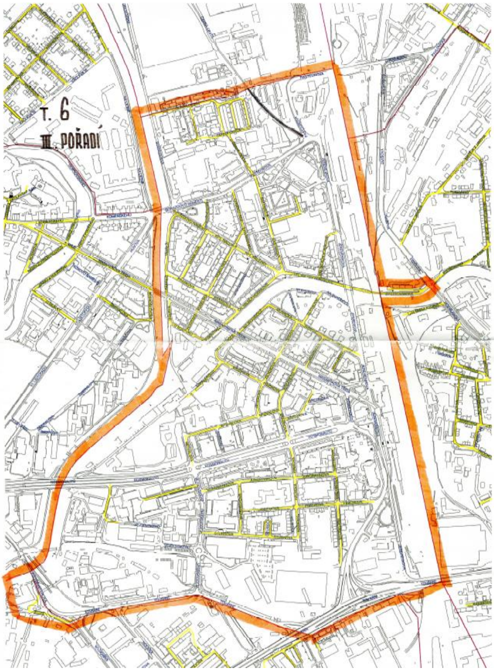

Fig. 1: Route (region) no. 6 from winter maintenance operational plan of Olomouc city.

The operational plan is the basic document for the management of actions in winter maintenance on local roads (roads and pavements) during the winter period. In the map section of the operational plan there are the communications usually recorded only as regions (Fig. 1). There is no planned itinerary for the transit of winter maintenance vehicle. The order of passage of winter maintenance vehicle is individual thing of the driver's knowledge of the region and adaptation to circumstances.

ALGORITHM

The issue of winter maintenance is known as the task of graph theory - Chinese Postman Problem or Route Inspection Problem. The name is derived from the problem when the postman has to go to post office to pick up letters and distribute letters at addresses in a city and eventually back to the post office. The aim is to minimize the length of the route.

Mathematically it is a graph representing the city where the edges (lines) of the graph represent streets and nodes correspond to street intersections. The edges are evaluated with positive numbers that correspond to the length of the street or its section [1].

If in the graph exists so-called Eulerian path (the move that contains every edge of the graph exactly once), then this move is the optimal solution to this task. If this move does not exist in the graph, then the postman is forced to walk some streets more than once. It also means that it is necessary minimize the sum of the lengths of streets repeatedly visited [2].

This problem (or algorithm that would solve it) has not been implemented in a GIS environment yet.

Instead of using Chinese Postman Problem method it was chosen to use a modified task of Traveling Salesman Problem, which is implemented in the GIS environment (eg. in ArcGIS, Network Analyst extension).

This task is trying to find the most optimal route possible not the lines (like the method Chinese postman problem do this) but with gradual visiting all fictional points. The Traveling Salesman Problem is a specified task when traveling salesman visits each point (city) and at the end of his journey must go back to the start provided the minimum distance going through the point (city) [1].

The traveling salesman problem is one of so-called NP-complete tasks. This is the class of tasks for which still does not exist a polynomial algorithm, whose time complexity is likely to be exponential. Elements of this class are interconnected so that if there were a polynomial algorithm for one of them, there will be a polynomial algorithm for all others. It is generally believed, for this class is no polynomial algorithm exists. This implies that every attempt to solve the traveling salesman problem grows exponentially as time entry calculation problem with the size [3].

CONVERSION FROM CHINESE POSTMAN PROBLEM TO TRAVELING SALESMAN PROBLEM

CONVERT LINES TO POINTS

By reasons mentioned in previous chapter it is necessary to convert a layer representing communications to a fictional point layer where each of point is one of many objectives. The result of each analysis is a modeled route through all fictional points in a different order. The first and the last point are of course in already pre-defined points. Mostly it is the same point.

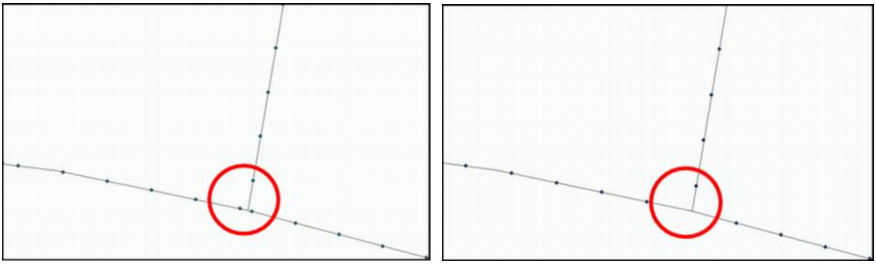

Fig. 2: Defining regular intervals of fictional points with /without extension X Pro Tools v7.1.

It has been tested several approaches for solving the conversion of line layer to fictional point layer. The first test used points as a represent of intersection (crossroads). In another test the points represented the intersections (crossroads) and center point of each of individual line section together. Finally, it has been tested method of line conversion with extension X Tools Pro v7.1. The conversion was made with an equidistance of 10 meters and 20 meters. This conversion shows good results with the minimum of line segments which were not serviced (Fig. 3).

This happens when winter maintenance vehicle reaches one point somewhere mostly in the middle communication. It should to the next point, but then it is evaluated that it is more advantageous turn around at this point to visit another points and return to this point from the opposite side. The result of this behavior is a discontinuous segment of line between two neighbor points of the size of ten or twenty meters (according the equidistance). This error occurs mostly near the crossroads.

Fig. 3: Not serviced segments of routes (red).

After calculating of the optimized route it was needed a manual edition of discontinuous segment using snapping tool. These manually edited discontinuous segments of routes are included in total lengths.

SETTING THE PARAMETERS

In GIS environment is needed to simulate near-real conditions of winter maintenance vehicle behavior. It is necessary to define one-way communication and allow reordering of stops (fictional points) for calculating the route and the first and last point remained unchanged. Turning of vehicles is allowed at any crossroads and at the death ends. The resulting route is in real geometry (true shape).

CASE STUDY OF OLOMOUC

Technické služby města Olomouce, a. s. is the responsible organization for the winter maintenance of communication (roads and pavements) on the territory of the city of Olomouc. According the operational plan of winter maintenance is the area of Olomouc city divided into 30 regions for the reason of winter maintenance. The operational plan is approved with the Municipality of Olomouc [4].

From all 30 regions it was selected 4 regions (routes). Two of them are mostly in areas of block of flats (route no. 7 – Nová Ulice and route no. 9 - Neředín). Route no. 8 passes through the residential area of villas west form the city center. The last one region (route no. 6 Nové Hodolany) is placed into the built-up area of apartment houses and one in normal urban residential area.

Calculated values in GIS environment were compared with measured values from GPS.

Tab. 1: Comparison of lengths of original and optimized route lengths[meters].

route no.	route		difference
	original	optimized	
6	18210,90	17084,80	- 1126
7	10246,69	10431,25	+185
8	22159,20	22271,26	+112
9	15872,33	15639,01	-233

Measured results show that current route is not optimal one (see Table 1). The best results were achieved at route no. 6. The shortening of the route is approximately 1.1 km.

Calculated value of optimized route no. 8 is slightly negative. The journey of vehicle after optimization is about 112 meters shorter than original one. From the point of view of the total length it is insignificant change (about 0.5 % more than original).

The results of routes no. 7 and no. 9 differs from their original lengths of 185 m and 233 m. Also these results can not be considered as more shorten than the original length cause of insignificant change (1.8 % and 1.5 %).

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Zimní údržba komunikací v městském prostředí za použití síťových analýz v GIS

Příspěvek pojednává o možnostech optimalizace tras vozidel zimní údržby na příkladu případové studie o 4 trasách na příkladu města Olomouce. U jedné z tras došlo k výraznému zkrácení trasy, u zbylých třech tras jsou změny ve výsledcích nevýznamné.

CREATION AND USE OF SPATIAL VISUALIZATIONS IN TERMS OF COPYRIGHT

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Abstract: *In geography and geoinformatics are often used or developed spatial visualizations in the form of plans, maps or pictures. The paper is focused on addressing the various aspects of copyright and legal issues in relation to the creation of cartographic works and outputs of geoinformation systems and the use of such products in practice and in education. Parts of the paper are illustrative examples of possible misuse of spatial visualization in specific areas of Geography and Geoinformatics, from which one can derive the possible legal uses. Authors of spatial visualizations can be easier orientated in the copyright legal issues and ensure better protection of their own work.*

Key words: *copyright law, cartography, geoinformatics, spatial visualizations*

COPYRIGHT ISSUE

In historical periods, from which there are written documents, there is no mention about copyright. Until the ancient, authors were rewarded for their work only by honour gifts from their patrons. The first official mention of copyright law has been preserved from medieval times - at that time were the so-called privileges that are granted by the sovereign. The first mention of copyright in cartography in the Czech Republic can be found in 1561, when

Helwig, creator of Helwig's map of Silesia, during the audience with Emperor Ferdinand I obtained "Prague Castle imprimatur" - permission to print with definition, that the illegal copies will be confiscated and there will be a fine for such treatment with a map of ten pounds of gold, while the fine was split equally between the author and Sovereign (Drápela et al., 2010). In 1709 in England there was published the first full copyright "Statute of Anne - Queen Anne's Act" (Tallmo, 2010).

Copyright laws were created around the world, based on different concepts. The basic ones are natural-law principle, monism property and personal rights (e.g. work in the U.S.) and the dualism of Rights (it was introduced also in the Czech legislation).

The most important international agreements on intellectual property rights are the Berne Convention and the Rome Convention for International Copyright and the Paris Convention, Madrid Agreement, the Nice Agreement, the Lisbon Agreement, the Madrid Protocol, Trademark Law Treaty, Patent Cooperation Treaty and the Convention on the Grant European Patents for industrial property rights (regulated by MIT, 2009). For international trade there is very important the TRIPS Agreement, which governs the protection of intellectual property rights in relation to international trade. Also this agreement, however, can be applied to global projects such as GIS and cartography.

COPYRIGHT PROTECTION IN THE FIELD OF CARTOGRAPHY AND GIS IN THE CZECH REPUBLIC

The issue of copyright law in the Czech Republic has been addressed by number of experts in the field of Geoinformatics and Cartography. In collective groups it is needed to call the association "Nemoforum" and the "Czech Association for Geoinformation".

Despite the extensive academic discussion is the interpretation of copyright law in relation to geographic data, cartographic products, the use of map servers and geodatabases, is still author's law protection debatable. The problems are not addressed only by providers and producers of data and cartographic works, but even laymen in their daily lives, when they want to use maps for example as part of the promotional leaflet of the company.

The current legislative of copyright law was in the Czech Republic adopted on 7th April 2000, with effect from 1 December of that year. (Quote Act 121/2000 Coll.) The law was modified in particular by Act No. 81/2005 Coll. and 216/2006 Coll. Putting it into force there have been replaced all previous rules relating to copyright.

An important part of copyright law is the definition that for each use of the work there is essentially required consent of the author. The law essentially requires the authorization to exercise the right to use the work (license) to another person. There are also possible contracts and licensing agreement with the fact that no such authorization is needed, in other cases possible use of the work is prescribed by law (Holcová, 2011).

PRACTICAL PROTECTION OF COPYRIGHT

From the group of all national map series (maps provided by the Czech Republic through the Czech Office for Surveying, Mapping and Cadastre) can be freely used only cadastral maps, which are not subject of copyright protection laws. Other state map works of the law are subject to the same protection as all other cartographic works.

Digital data and data layers that are provided by the Czech Republic (by the Czech Office for Surveying, Mapping and Cadastre) are all subject to copyright protection laws. Thus provided data therefore can not be freely used for production of other cartographic or GIS products without a license.

In the commercial sphere of cartography, we see the production of new cartographic works with reproductions of older works. In the field of old map works; the copyright is legally free after a period of 70 years since the death of the author, in the case of multiple authors from the death of the last authors, in the case of anonymous works, and institutional from the date of publication of cartographic work. Such cartographic work can be further adjusted and distributed, in modified form even in the original.

In the field of newly issued cartographic works, copyright law protection extends to all printed works as well as digital products. The author can make a special copyright protection by using a special license agreement.

For digital products, and GIS software, the legal protection is primarily guided by specific legislative measures that include the protection of geodatabases, computer programs, websites, etc.

EXAMPLE OF POSSIBLE MISUSE OF CARTOGRAPHIC AND GIS PRODUCTS

Use of the map section

Perhaps the most common violations of copyright in the cartography is usage of the scanned map, when is used a section of this map, mostly in the leaflet or advertisement of a company. Map is usually accompanied by the arrow, circle, etc. indicating the domicile or establishment of the society that leaflet awards.

Modification of the original work

Another way to abuse the map may be the use of cartographic work for the creation of new cartographic work, just by the initial enrichment of thematic maps folder.

Abuse of spatial layers and map keys

In addition to violations of copyright in cartography, which is used for initial mapping work in the same visual style and abuse is so obvious for the general public; there are also ways that are for the first look for non-specialists less recognizable.

Re-processing works

Difficult to exploit a proven way of cartographic work is the complete overwork. The map is created by digitalization of original work and re-processing of map creation. Some elements contained in the original map are not in the new work other thematic elements may be new.

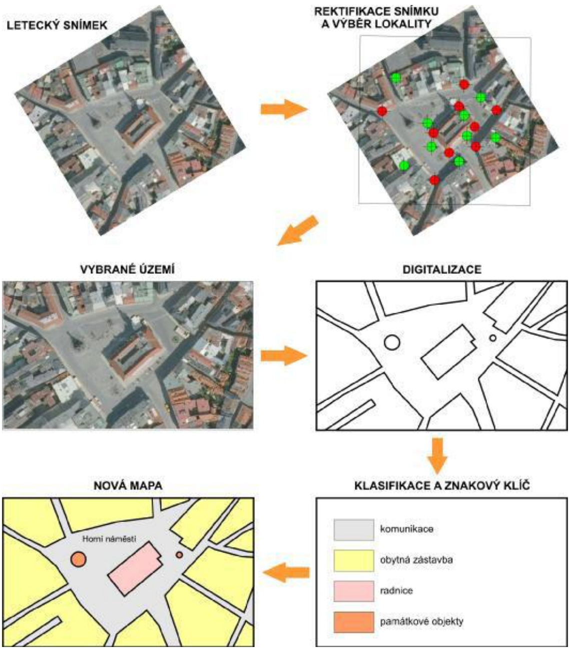

Fig. 1: Example of re-processing of original work.

Abuse of satellite and aeroplane images

A similar case is the unauthorized use of aerial photographs (or other photo), from which the map is created. In this case is the work is protected as each original work and using of this work without authorization is a violation of copyright laws.

Editing of spatial data layer

In this example it is realized illustration of what results can be obtained by modifications of the original spatial data layers. It is adaptation of the original work and it is also an abuse the work.

RECOMMENDATIONS FOR AUTHORS AND USERS OF SPATIAL VISUALIZATIONS

Recommendations for the authors of spatial visualizations in the form of cartographic works and products of geographic information systems, as well as for users of these works, which want to use these products in non-standard way, are as follows:

- Never distribute or reproduce any work of another author in the original or in amended form if you don't obtain its written consent. The rule applies to all products of cartography and geoinformatics - maps, images, tables, data layers, as well as their cut-outs or any of their adaptation.
- Never use the work for which author is not listed. For example – websites can contain maps, geovisualizations, images, etc. without apparent author. With some probability this is the case of a violation of copyright laws protect the original work. Copyright law protection applies to all creative results even if the author is not listed – the copyright for work are still valid.
- Study in detail the licensing terms and conditions of use of the work. Although there is used license such as Creative Commons and some part of the work is released from copyright protection, it still must follow rules for their further processing and reproduction. Likewise, for example map server can be used in the form of interactive windows with a specific localization on the user's personal pages, but can not be used on site with commercial content, etc.

CONCLUSION

There was defined the protection of copyright law in the field of GIS and cartography in the Czech Republic on the basis of current legislation, which placed great emphasis on the interpretation of copyright law experts on the legislation. Based on this knowledge there were defined shortcomings in the protection of copyright and there were set guidelines to implement legal creation into the spatial visualization.

There are set specific illustrative cases in which there is a conflict with the legal protection of copyright works. Authors of spatial visualizations can protect their work based on learning from examples of abuse cartographic works and GIS products.

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Tvorba a používání prostorových vizualizací z pohledu autorko-právní ochrany

V geografii a geoinformatice jsou často používány nebo vytvářeny prostorové vizualizace v podobě plánů, map nebo nákresů. Příspěvek je zaměřen na řešení různých aspektů autorsko-právní problematiky ve vztahu k tvorbě kartografických děl a výstupů z geoinformačních systémů a k používání takovýchto produktů v praxi a ve vzdělávání. Součástí příspěvku jsou ilustrační příklady možného zneužití prostorových vizualizací z konkrétních oblastí geografie a geoinformatiky, z čehož lze odvodit možné legální způsoby využití. Autorům prostorových vizualizací umožňuje příspěvek snadnější orientaci v autorsko-právní problematice a zabezpečení lepší ochrany vlastního díla.

METAINFORMATION SYSTEM OF GEODATA FOR STUDY AND PRACTICE

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Abstract: *Metainformation systems are pivotal when carrying out operations with geodata, for example, sharing and exchange. This paper presents the metainformation system MICKA, which is running at Palacký University in Olomouc.*

Metainformation system is introduced at the department administration board requests. Own metadata department profile UPOL is used. This profile complies with the ISO 19115 standard. Metainformation system is a system designed to store three categories of metadata: bought (acquired) data for educational purposes, data created during the scientific and research projects, and students' data that are created in the bachelor, master or doctoral theses. The student diploma works produce the largest number of data sets.

Our own system of coded identifiers was designed to distinguish between the groups of data acquisition. Moreover, user groups, as well as individual users, were defined. Groups and users have specific rights that allow them to search, create and edit metadata records. Metadata records are divided into public and private (non public). Public records are open for anyone in the world to browse through. This is achieved by including the Metainformation system in the Czech National Geoportal INSPIRE [7]. Currently, the system holds over 370 records, of which 118 are public. The non public records are mostly the geodata that were purchased or licensed and, therefore, are not to be shared further.

Metainformation system is in compliance with the requirements of the INSPIRE directive. Information about the spatial extent, data format, contact person, data lineage, and data quality is important from the interoperability point of view. All these data are recorded in metainformation system MICKA. Every new metadata entry is checked to meet the requirements for mandatory information. The MICKA metadata catalogue will certainly contribute to increase the availability of geographic data not only within the university department. The implementation of the system at Palacký University is so far a unique project of the Czech education system. The metainformation system should immensely contribute to higher availability of data not only at the university but within the scope of all users in geoinformatics profession.

Key words: *INSPIRE, maintenance, metadata, MICKA.*

INTRODUCTION

According to the 2007/2/ES directive about setting up an Infrastructure for spatial information inside the European association INSPIRE [3, 4], which came to power as a part of the law 123/1998 Sb., the Palacký University is one of the institutions obliged to provide spatial data into the infrastructure. Nevertheless, the necessity to introduce a metainformation system was felt at the department since the year 2004. Every year the numbers of bought, acquired and created data were increasing. In 2004 metadata from students' works were collected for the first time. At that time, the MIDAS Lite was used for that purpose. MIDAS was designed at VSB Technical University in Ostrava, Institute of Geoinformatics [1, 6].

However, with the INSPIRE directive coming into power, it was necessary to migrate to another metainformation system. Metainformation system MICKA was chosen as a new metadata maintenance tool in 2009. The MICKA system is a product of HR-RS, Help Service Remote Sensing company [2]. This system was selected mainly for the fact that it was best complying with the INSPIRE requirements. Moreover, it was the most widely used metainformation system in the Czech Republic. Metainformation system MICKA runs directly on our department server and uses the PostgreSQL database server. Since 2010, the system is fully functional and is regularly filled with new metadat. The system mainly serves the employees of Palacký University and students of Geoinformatics department; it is, however, also open to public.

PRACTICAL PURPOSE

The metainformation system runs on the following URL address: http://gislib.upol.cz/metadata [5]. Searching for metadata is either performed by lexical data input (word, keyword, thematic category) or by selecting a bounding box directly inside a map on the right side of the window. It is also possible to combine both. Detailed description of the search process can be found in the user's guide (button Help on the left menu). When browsing the records, only public entries are displayed to a user which is not logged in (user guest). The search screen of the system is on Fig. 1. The result of a search in "elevation" category is shown in a well-arranged table (Fig. 2). The table includes the names of the metadata entries (bold blue letters), and corresponding abstracts. More details are displayed after clicking the record name.

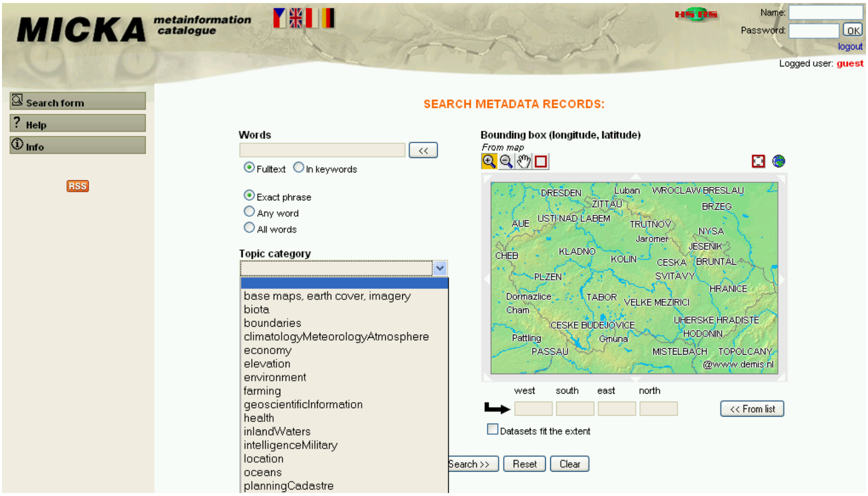

Fig. 1: Interface of Metainformation catalogue MICKA – mode Search

Fig. 2: Resultant metadata records for search in "elevation" category

STRUCTURE OF THE METADATA

All recorded metadata comply with ISO 19115 standard. For the purpose of storing metadata, our own *UPOL* profile was established. Moreover, a system of coded identifiers was created for the purpose of searching and differentiating the records [8]. This code is recorded in the *Identification – Code* element.

Tab. 1: Coded identifiers for identification of the data origin

Coded identifiers	Meaning
KGIDATA	Purchased (received) data
KGIPROJ	Data of scientific project
KGISBP	Data of student bachelor thesis
KGISDP	Data of student diploma thesis
KGISPP	Data of student doctoral thesis

The next required value is the name of the diploma work and the name of the supervising teacher. These are entered into the *Identification – Purpose* element. Descriptive *Keywords* are chosen from GEMET or INSPIRE thesaurus. The name of the student is stored in the *Metadata Contact* element. Spatial representation, reference system, and data format are another important values saved together with every record. *Data Quality – Lineage* can also be of high significance. Short text, named type of spatial analysis, description of the steps in data creation process, type and technical parameters of measurements (GPS, theodolite) etc. are mentioned in *Lineage* element.

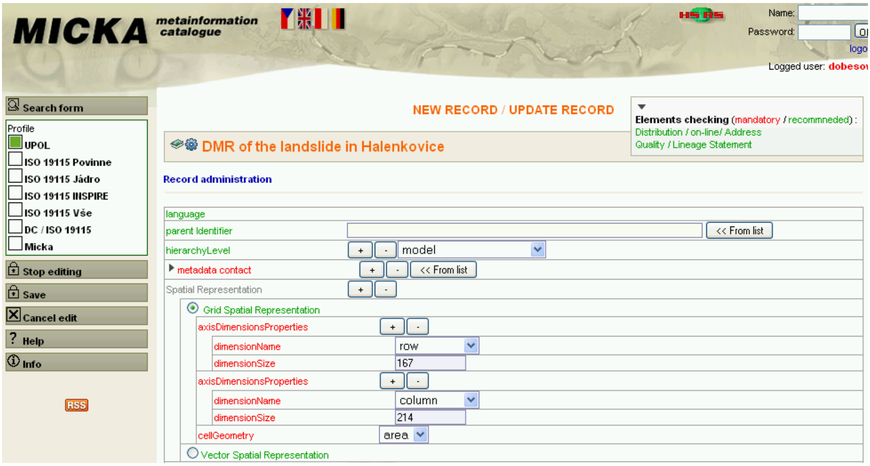

Fig. 3: The interface for "New record /Update record" with checking mandatory/recommended elements (upper right menu)

In order to ensure correct metadata input, a manual with instructions was made and included within the application. In addition, the mandatory fields are checked for errors when new information is being added (Fig. 3.). Redcoloured fields are mandatory, while green fields are recommended. Information is filled both in Czech and English, so that the metadata records can be searched by users all over Europe.

WAYS OF OBTAINING METADATA

Altogether, there are three sources of data whose metadata are stored in the metainformation system. The first group is represented by the data that are purchased or acquired from external distributors. These are vector or raster data sets provided by companies and state organisations such as ČÚZK (Czech Office for Surveying, Mapping and Cadastre), ČSÚ (Czech Statistical Office), ArcDATA Praha, GEODIS etc. These data are of pivotal importance, and serve as a base for education and diploma works. It is also essential to let the members of the department know that these data are available. In total, there are 34 data sets from this group stored in the system. These entries are not public due to the fact that the University is not authorised to share them further on. The data of this sort are added by the department administrator.

The second group comprises of the data created during a scientific and research projects of the department. This group contains the smallest number of 9 entries. The data from this group are always added by the administrator after a consultation with the author of the data.

The third group is the largest, and it is formed by the data produced by students' diploma works. Since 2009, the entries are added by the student themselves. The main reason for this is the fact that the author of the work is the one who can best summarize and describe the data as far as the content, accuracy, quality and the process of formation are concerned. For this purpose, two extra users of the system are defined "bakalar" (bachelor) and "magistr" (master). Both of the two extra users have permission to add new entries. The only restriction is the time period within which the students have to upload their records. They are obliged to do so in the span of two weeks before the final deadline of their works. The final review of the new records is done by the administrator, who is also in charge of setting the entries as public or non public, depending on their type and purpose. Students also include the source data, which they used for the diploma work and which are always non-public. In most cases, these are 10 free map lists from ČÚZK.

Apart from the metadata of the contemporary works (last 3 years), metadata from the works since the year 2000 were also recorded. The precise description was, however, more difficult, as the accuracy and the method of the data formation could not be determined.

Tab. 2: Numbers of metadata records (15. August 2011)

Type of record	**Number (count)**
Total count of records	370
Public record	118
Nonpublic (private) record	252
Student bachelor thesis	138
Student diploma thesis	187
Purchase (receive) data	36
Data of scientific project	9

Gradually, the number of the records is growing. Every year, about 40 new student works extend the total amount. Yet not every work introduces absolutely new data. Additionally, latest purchased and research project data contribute to the number of entries.

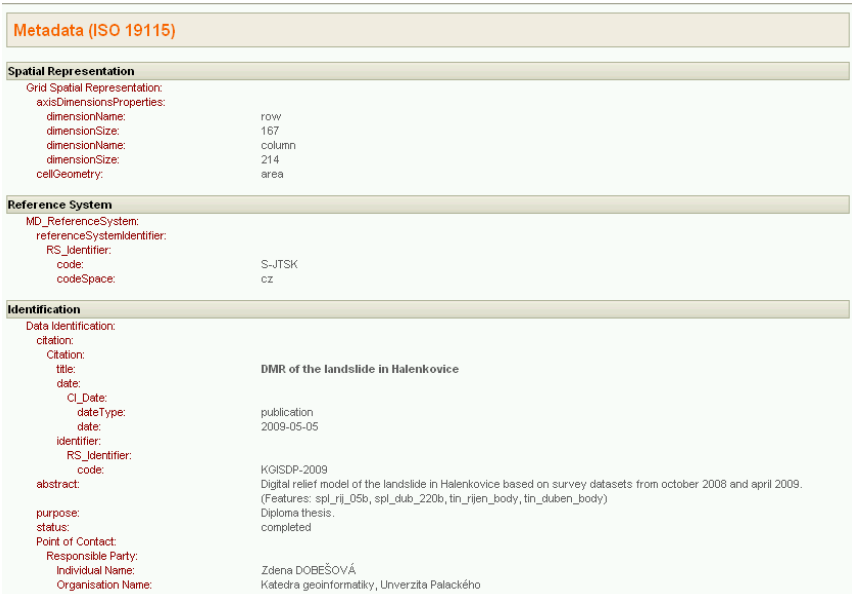

Fig. 4: Detail of the metadata record

The metadata information system is managed by a member of the department – the administrator of the metadata (Z. Dobesova). The administrator is also filled in *Point of Contact* element for the purpose of data distribution. More user groups and users were created for the maintenance purposes. The groups are “*administrator*” and “*diplomant*”. When a student needs access to the non public entries the account “*Student*” is to be used.

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Metainformační systém geodat pro studium i pro praxi

Pro sdílení a výměnu geodat je důležité provozovat metainformační systémy. Řada geodat vzniká v rámci studentských prací na vysoké škole. Na Universitě Palackého v Olomouci je od začátku roku 2010 provozován naplněný metainformační systém MICKA.

Metainformační systém byl upraven pro potřeby pracoviště. Používá se vlastní metadatový katedrální profil UPOL odpovídající normě ISO 19115. Metainformační systém má navržen systém pro ukládání třech skupin metadat: nakoupená (získaná) data pro výuku, data vzniklá v rámci vědeckých a výzkumných projektů a studentská data, která vznikla při bakalářských, magisterských nebo doktorských pracích. Největší počet záznamů je o datech vzniklých v rámci studentských prací. Byl navržen vlastní systém kódových identifikátorů pro odlišení skupin dat a roku pořízení. Jsou nadefinovány skupiny uživatelů a jednotliví uživatelé. Skupiny a uživatelé mají nadefinovaná práva, která umožňují vyhledávání, anebo tvorbu a editaci metadatových záznamů. Metadatové záznamy jsou rozděleny na veřejné a neveřejné. Veřejné záznamy jsou přístupné komukoliv v ČR. Informace o datech jsou tak přístupné i pro uživatele z praxe. Metainformační systém je zařazen do celostátního vyhledávání pod Národní geoportál

INSPIRE [7]. Řada dat, které se zpracovávají pro reálné potřeby, v praxi se běžně z univerzity předávají na koncová pracoviště mimo UP.

V současné době je v systému evidováno přes 370 záznamů. Z toho je 118 záznamů veřejných. Neveřejné záznamy jsou o datech, která jsou nakoupena nebo účelově vázána a tudíž nemohou být poskytnuta dále.

Metainformační systém je v souladu s požadavky směrnice INSPIRE. Z hlediska interoperability geodat jsou důležité informace o prostorovém rozsahu, formátu dat, kontaktní osobě, rodokmenu dat, kvalitě dat atd. Všechny tyto údaje jsou v metainformačním systému MICKA zaznamenány. Při vstupu údajů do metadatového záznamu je prováděna kontrola na vyplněnost povinných údajů.

Provozovaný metainformační systém určitě přispěje k vyšší dostupnosti geodat to nejen v rámci pracoviště ale i uživatelů v praxi. Článek prezentuje konkrétní realizaci a provozování metainformačního systému na Univerzitě Palackého, které je v oblasti vysokého školství ojedinělá.

STUDENTS' CARTOGRAPHICAL KNOWLEDGE IN CRISIS MANAGEMENT

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Abstract: *The presented research is devoted to exploring knowledge in field of crisis management for children like specific part of population. Currently there are natural disasters due to climate changes. Very often they used to be tragic, they cause human sacrifices and damage to property. Because of this is very important to raise awareness among people about how to behave in case of threat. Children represent a specific group, which is the most vulnerable. Dangerous situations are very frustrating for them. Is necessary to join this part of education into the educational process.*

This paper informed of the results of research, which was realized at elementary schools in Czech Republic and Slovakia. In the first part of the research pupils filled the questionnaire with opened questions. This part allowed a qualitative analysis of solid problem. In the second part children made their own crisis maps and map symbols for situation of flood. The results of the research are referral for next application purposes related educational and cartographic works.

Key words: *children, crisis management, crisis situation, flood, map symbol*

INTRODUCTION

We are living in vulnerable world. Nearly every day we can find information about natural disasters. While in natural ecosystems, such extremes are part of a natural development, in a cultural landscape with still more complicated infrastructure to human society cause a great material damage and loss of life. Every year millions of people are affected by natural disasters, which are unexpected and coming without warning. This dangerous situation is difficult to manage, not only for adults but also children. Critical situation can be traumatic for them. Although it is not possible to prevent hazards we can prepare for them, expect them and then can quickly and correctly respond to.

The one of the role of the cartographer is to create a specific map for early warning and crisis situation needs. Children represent a specific group of population for which the maps are characterized by the fact that they are simple, transparent, clear and easily understandable. The creating of these maps is not everything. It is very important to teach children how to use the maps, how to navigate in the environment using maps and to teach them how to read map symbols. In many countries national and international organizations have started to examine children's knowledge of crisis management and crisis situations. Several studies aimed at studying the process of working children with map already made (In Bulgaria, Austria, Czech Republic and Slovakia [1] In Bulgaria [2] In Hungary and Argentina [3] In Athena, Greece [4]). The main aim is to educate a large number of students and the best way how to do it is with games and attractive activities for children.

The part of this research is to obtain information on knowledge of Czech and Slovak pupils in crisis management and ability to work with the map. Testing children took the form of a questionnaire survey and children's own creative activity in designing their own map symbols and their subsequent use in a crisis map for flood.

BACKGROUND

The Centre for Research on the Epidemiology of Disasters (CRED) and World Health Organization (WHO) defines a disaster as “a situation or event which overwhelms local capacity, necessitating a request to a national or international level for external assistance; an unforeseen and often sudden event that causes great damage, destruction and human suffering”. Hydrological disasters remained the most common disasters in 2009, accounting for over 53% of total natural disaster occurrence. A total of 180 hydrological disasters (82.8% floods and 17.2% wet mass movements) caused over 57.3 million victims in 2009. [5]

In the Czech Republic the most frequent disaster is flooding. Flooding in Moravia in July 1997 was the biggest flood in modern Czech Republic. Flooding in Moravia was part of a European scale disasters, because in addition to the Czech Republic were also affected Poland, Slovakia, Austria, and partly also of Germany. The flood affected the third of the territory of Moravia and Silesia. In addition to victims of life and enormous material damage was not only suspended the operation of key railways lines, but a few days was disrupted telephone network. In the worst affected village is considered Troubky at the confluence of the Morava and Becva, where killed 9 people. During August 7-16, 2002, Prague was plagued by a disastrous flood, during which the level of culmination and maximum flow rate and seriousness were the biggest in the history of Czech floods. Sixteen people died, 225 000 of citizens were evacuated and the overall flood damages reached 3, 5 billion €. The most frequent disaster in Slovakia is flood too, especially in eastern part of country. The most tragic of them was flood in July 1998. As a result of destructing flooding, known as 1000-year water has killed 63 victims most of them came from village Jarovnice. 3000 people had to be evacuated. The total damage has reached 2, 27 million €.

These large and devastating floods in addition to major damage and loss of human life very negatively affect the human psyche. In a very short time people are losing their property and sometimes family members. These negative experiences can affect them for life. Special attention should be given to children because they are more vulnerable in a crisis situation. They do not know what is going on and they must be preparing for it.

RESEARCH EXPERIMENT

The research experiment was conducted at elementary schools in Czech Republic and Slovakia in two groups: 8-10 years and 11-13 years children. This age were selected with regards to changes taking place at the age of 11 years. At this age children varies ability to perceive and understand abstract concepts and more complex logic operations. This change was also described as Piaget's theory of cognitive development. [6]

The research experiment was based in first step on a questionnaire and analyses of the answers. The questionnaire has 14 questions in the field of cartography and crisis management. The research in second step was based on children's own creative activity in designing their own map symbols.

THE QUESTIONNAIRE

1. What do you know about maps? What do the maps represent?

Responses the question pupils were positive. The most common answer was that maps showing cities, transport communications, rivers, borders, mountains, landscapes and more. Their use is mainly for orientation and navigation. Several students wrote that the seas are blue and forest green.

2. Do you think that you have enough knowledge to work with maps? If the answer is YES, where have you learned it from? If the answer is NO, what are the reasons?

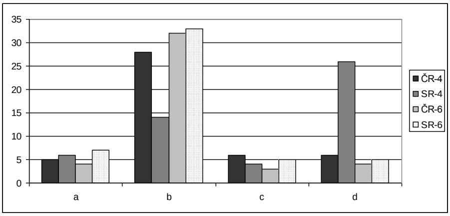
All pupils have submitted a join response – fourth grade pupils in lessons about homeland and history, sixth grade pupils on geography lessons.

3. How do you understand the terms: risk, hazard, disaster, crisis?

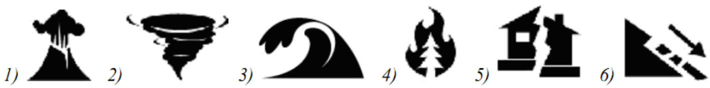
Most of students on this issue did not respond at all. The term risk means for example go to the edge of cliffs, where there is no fence, to undergo a dangerous situation, exposing life in danger, loss of work, or walk down the street in the evening and have € 200 in your pocket. The term hazard means fallen wire to the ground under an electric shock, tsunami, flood, explosion of oil and other hazardous situations. Disaster means flooded village, tsunami in Japan, earthquake, people dying, fires, or the end of the world. Crisis is for example lack of money and food.

4. What a shape of a sign is associated with a danger situation?

The most frequent answer on this question was b) triangle. Only Slovak younger students have d) diamond like the right answer. Psychologically, in people sharp edges evokes the danger.

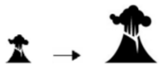


5. What do the different symbols represent?



Students without a doubt correctly identified almost all the symbols. They have problem with understanding symbols number 6, 7, 8 and 11. These characteristics should be revised. (1. eruption, 2. tornado, 3. tsunami, 4. forest fire, 5. earthquake, 6. landslide, 7. avalanche, 8. desertification, 9. flood, 10. hurricane, 11. landslipe)

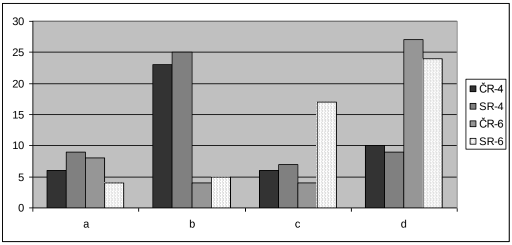
6. What do you understand by the difference of the symbols?



Pupils understand this symbol as the most often little danger/ hazard larger, possibly as a smaller and a greater degree of impact the eruption (minor character is farther).

7. How will you draw/represent on a map a disaster region?

In response to this question they already know each other varied. Slovak younger students chose answer b) as well as Czech younger students. Older student from both countries gave d) like a right answer.



8. How do you understand the level of danger situation with this colors?

a) Extreme level! Very danger!
b) Warning! High level of danger!
c) Be careful! There is a risk of danger!
d) Safe conditions! There is no danger!

Absolutely correct answers associated with the colors had only 50% pupils of fourth degree in both countries, in group of older students it was 70%. The most common mistake was between yellow and orange. Red and green color students correctly identified.

9. Do you know something about the hazards in your area? Please, write down a list of them?

The most frequent answer was flood, flooding, fall of meteorites, earthquake, desertation, landslides, fires or destroyed roads, cutting the trees for new shopping centers buildings.

10. What is a topographic map? What does it contain?

On this question the majority of pupils did not know the answer. In most cases, it completely missed. From the group of Slovak younger students all of them responded, though not always correct that is a view from above, showing which way to go, roads, towns, landscape scale, the map of affected areas is different from the normal map, describing our surroundings and others. Pupils do not understand the concept of topographic map.

11. This is a part of topographic map. Please, write down what do you see on it.

This question was very difficult for pupils and they left it unanswered. Some of them wrote that on topographic map we can see roads, houses, fields, rivers and towns.

12. You have a holiday in a tent near a river. In evening time TV forecast informs you that a heavy rain will come this night and floods are expected. You have a map of your region. What kind of objects do you expect to be represented on the map and to help you in expected dangerous FLOOD situation?
13. You have a holiday in a tent near a river. Suddenly somebody informed you that a fire appears not far away from you. You have a map of your region. What kind of objects do you expect to be represented on the map and to help you in expected dangerous FIRE situation?
14. You are in a similar situation like both above. Do you need other information, except a map, which will help you to decide where to go or what to do?

Questions 12, 13 and 14 pupils hardly responded. In some cases it was possible to find answers: escape to the mountain, eventually would call their parents.

MAP SYMBOLS

Fig.1: Map symbols drawn by younger students

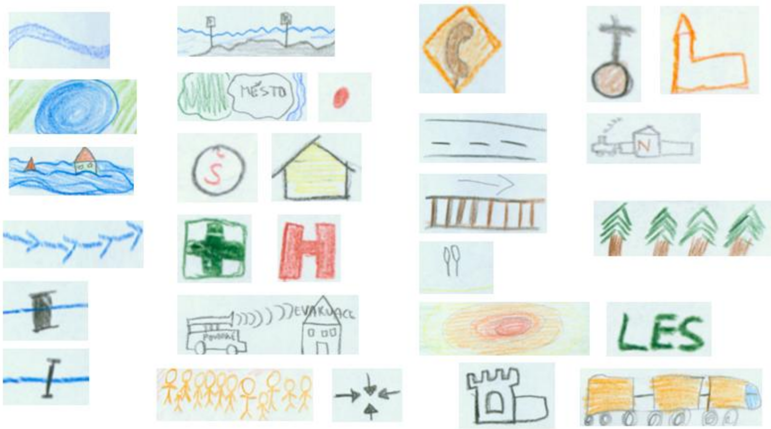


Fig.2: Map symbols drawn by older students

Map symbols that children draw: river, water surface, flooded area, water flow direction, the bridge over the river, wooden bridge, ford, city, school, hospital, evacuation center, assembly point, kiosk, main road, lane, railway track, hill, castle, chapel, church, train station, forest and their own characters. The whole work should be available one lesson (45 min).

CONCLUSION

When comparing the different categories of detailed answers provided by the Slovak pupils, Czech pupils usually respond by using one word. The first three questions students were administered comprehensive response, which is evidence that the maps at school often work and can use them. Nevertheless they do not know the meaning of topographic map. Last four questions remain unanswered. There could be more reasons, but it certainly is not one, this would not know the answer to the question.

Very big different between symbols of younger and older students is visible in the way of image. Symbols of younger students are more illustrated; older children are drawing more simple and graphic symbols.

Understanding the development process of psychological thought and abstraction of objects and phenomena in children in different age categories is necessary to know cartographer to create map products for this specific group of sufficiently clear and properly understood.

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Kartografická gramotnost dětí v krizovém managementu

Nejvhodnějším nástrojem pro orientaci v prostoru a tedy pro rychlé rozhodování v kritické situaci je mapa. Děti jim ale často nerozumějí a neumí je číst. Proto je potřeba s nimi pracovat a porozumět jejich myšlení, dívat se jejich očima. Správné pochopení vnímání dětí umožní kartografovi vytvořit relevantní mapu právě pro ně.

Na základních školách v České republice a na Slovensku byl uskutečněn výzkum, jehož hlavním cílem bylo získat informace o povědomí dětí o povodních. Výzkum byl proveden ve dvou věkově odlišných skupinách, 8-10 let a 11-13 let, pomocí dotazníkového šetření a vlastní kreativní činnosti dětí. Ty samy navrhovaly mapové symboly pro krizové mapy použitelné v případě povodně.

ANNEX II AND III OF INSPIRE DATA SPECIFICATION TESTING AT COSMC

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Abstract: *In article we share our experiences, that we reached during testing of second and third annex of INSPIRE data specifications. At COSMC (Czech Office for Surveying, Mapping and Cadastre) we will focused on testing of INSPIRE theme Building. Other themes of second and third annex are also mentioned, because COSMC is a coordinator of Czech Thematic Working Group DATA of Czech INSPIRE Committee.*

Data specification testing is planed until second half of October so there can't be provided full description of testing process, but only main principles are shown.

Key words: *INSPIRE, UML, GML, data specification*

INTRODUCTION

Testing of INSPIRE data specification is an important part of implementation of this European regulation in any organization. It represents adequate time for quantification of all works that must be done for future successful INSPIRE implementation.

It is also opportunity to influence final version of INSPIRE data specification. Influence is represented by form of recommendations and complains in report of testing. These recommendations can affect next version of data specification.

TESTING ORGANIZING

Testing of second and third annex of INSPIRE is under way in current time. Planned end of testing is set to 21st October 2011. Any organization that wants to join must be registered at European Research Centre (JRC). Registration is possible to do any time during testing period. So it is possible to join pan-European testing effort even last day.

Tab. 1: Themes of annex II

1. Elevation
2. Land cover
3. Orthoimagery
4. Geology

But it is also possible to send comments and recommendations without any registration. This is possible, because CENIA (Czech Environmental Information Agency) collects any recommendation and comments to INSPIRE testing from any organization that is interested in it.

For organizing of INSPIRE data specification testing is responsible Technical Working Group DATA (TWG DATA), that was established by Czech Coordination INSPIRE Committee. Czech Office for Surveying, Mapping and Cadastre (COSMC) is commissioned to manage this group, because of its success in first data specification testing. It should be reminded, that during second and third annex testing, first annex can be still comment as a standalone or with connections to second and third annexe.

Tab. 2: Themes of annex III

1. Statistic units	12. Natural Risk Zones
2. Buildings	13. and 14. Atmospheric Conditions and Meteorological Geographical Features
3. Soil	15. Oceanographic Geographical Features
4. Land Use	16. Sea Regions
5. Human Health and Safety	17. Bio-geographical Regions

6. Utility and governmental services	18. Habitats and Biotopes
7. Environmental Monitoring Facilities	19. Species Distribution
8. Production and Industrial Facilities	20. Energy Resource
9. Agricultural and Aquaculture Facilities	21. Mineral Resources
10. Population distribution	
11. Area management/restriction/regulation zones and reporting units	

TESTING

COSMC had also joined testing of first annex of INSPIRE data specification. This annex contains nine themes (1. Coordinate reference systems, 2. Geographical Grid Systems, 3. Geographical Names, 4. Administrative Units, 5. Addresses, 6. Cadastral Parcels, 7. Transporting networks, 8. Hydrography, 9. Protected Sites). COSMC focused mainly its testing on theme Cadastral Parcels. Other themes as Addresses and Administrative Units were also accomplished. In a difference testing of second annex COSMC focused only on theme Building.

The main goal of testing was to compare four different data models of INSPIRE data specification of theme Building with two different Czech proprietary data models of Buildings. First system represents Cadastral registry (Informational System of Czech Real Estate) and second system is Informational System of Czech Territorial Evidence (ISCTE). Both systems contains data that represents INSPIRE buildings.

But only ISCTE was chosen as a source of geometry for theme Building, the first source (ISCRE) will be used for connection theme Building with theme Cadastral Parcels (reference theme) from first annex. Other connection with INSPIRE theme Addresses will be also provided by ISCTE.

For testing is necessary to understand data modeling in UML and XML schemas represents by GML 3.2.1 standard. The output file of GML 3.2.1 that is valid with INSPIRE schemas is best confirmation of successful transformational test. Therefore COSMC mainly focused on this result of testing. Other results as INSPIRE View Service or even WFS were not chosen as goals for COSMC testing.

RESULTS OF TESTING

Testing confirmed that all necessary attributes and relationships that are mandatory for publication of INSPIRE theme Buildings are presented in source database (production database of ISCTE). Testing also confirmed that it is not suitable to publish INSPIRE data directly form source database (production database). Therefore data will be published to INSPIRE infrastructure same way as data of INSPIRE data specification of first annex (Cadastral Parcels, Addresses, Administrative Units). Which are successfully published through publication database (picture 1).

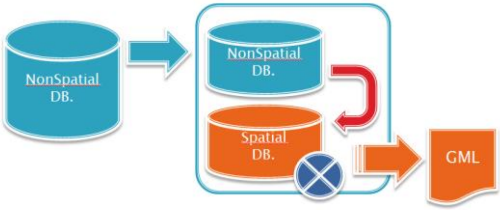

Fig. 1: Scheme of Publication database

As a result o any INSPIRE data specification is strongly recommended to complete report of testing that is represented by 40 questions from JRC (Joint Research Centre). Answers to these questions will give enough feedback to JRC to improve next version of data specification.

CONCLUSION

COSMC had second time joined INSPIRE data specification testing. The first testing was considered as very beneficial. It gives possibility to work and become familiar with UML, GML, WMS and other technologies on big scale project, that INSPIRE is representing.

We recommend to other organizations to join the testing of INSPIRE data specification, because it is only way, how we can adapt these specification to Czech needs and specific environment. Just because the second and third annex testing had joined nine Czech organizations, this represents the most organizations in whole Europe, we can success in it!

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Testování datových specifikací INSPIRE témat přílohy II a III v prostředí ČÚZK

V článku se podělíme se zkušenostmi, které jsme získali v průběhu testování datových specifikací INSPIRE témat z druhé a třetí přílohy. Na Českém úřadu zeměměřickém a katastrálním se budeme věnovat zejména testování tématu budovy. Vzhledem k tomu, že náš Úřad je koordinátorem TPS DATA pod KOVIN, zmíníme se o organizaci testování dat přílohy II a III obecně.

Testování datových specifikací probíhá až do poloviny října 2011, takže zde určitě nemůže být kompletní popis procesu testování, ale hlavní principy zde nastíněny budou.

DETECTION OF HISTORICAL PATHS CHANGES BY UNMANNED AERIAL VEHICLE

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Abstract: *First works devoted to the study of historical paths originated in the first half of the 19th century. Milestone in the research of historical path dates to the 90s′, when first extensive field researches of relics of old paths were performed. As a result of these researches, new theories about positions of old paths started to emerge. Research gradually becomes an interdisciplinary field associating departments of history, archaeology, historical geography, as geology and geoinformatics. On the other hand, various types of remote sensors are currently available to help explore landscape and other natural components. The main part of this field is based on a small format aerial photographs (SFAP) taken by a small aircraft. Self-made aerial photographs offer researchers a maximum operability. The technical parameters of the capturing device and platform help to the photographer in determining not only place and time, but also the point of view, image coverage, and exposure settings. The Drone PIXY is a slow moving model of motorized paraglider primarily used for close-up remote sensing, allowing classical or digital aerial images and video recording at ultra-low height (50 - 500 m). This paper deals with searching of historical paths forced by a small-format aerial photography in Moravia, a region in the Czech Republic.*

Key words: *SFAP, historical pathways, remote sensing, photography*

INTRODUCTION

First works devoted to the study of historical paths originated in the first half of the 19th century. The work was done mainly in the field of historical geography as a collection of archival materials. This situation remained almost unchanged up to the second half of the last century, when other research disciplines, especially archaeology, began to be active, beside dominant historical geography. Another milestone in the research of historical path dates to the 90s´, when first extensive field researches of relics of old paths were performed. New theories could go out of this research [2, 3, 4]. Research gradually becomes an interdisciplinary field associating departments of history, archaeology, historical geography, geology and geoinformatics. Similar activities can also be traced outside of the Czech Republic: in the Bavarian part of Šumava Mts. (P.Praxl, 1995), in Oberpfalz (D.J.Manske, 2003), in the German part of Krušné hory Mts. (R. Wissuwa, 1998), in Slovakia (M. Slivka, 1998; M. Hanuliak, 1998) and in Poland (J. Sadowska-Topór, 1999).

Works on a four-year project named „Research of historic routes in the north of Moravia and eastern Bohemia“ were begun in 2011. This project is a part of the programme of applied research named „Program of applied research and development of national and cultural identity (NAKI)“ supported by Ministry of Culture of the Czech Republic. The project is follow-up to the research made in the north-western part of Moravian region – delimited by historical boundary (Olomoucko, Litovelsko, Konicko, Jevíčsko, Svitavsko, Moravskotřebovsko, Mohelnicko) [2, 4].

Project will use classic methods of research (terrain survey) as well as modern ones, e.g. ground geophysical radar, aerial photography, laser scanning, and small format aerial photography from remote-controlled model. Experience from the process of acquiring images and interpretation will be described below. It is necessary to find out localities of possible occurrence of historical paths which is possible thanks to historical and other sources.

IDENTIFICATION OF HISTORICAL PATHS BY STUDYING MAPS AND ORTHOPHOTOS FROM NORTHERN MORAVIA AND EASTERN BOHEMIA REGION

Areas of the regional and historical long distance roads

Traces of historical paths can be seen on maps from IInd Military Survey (years 1836–1852). These paths often took place outside of the structure of municipal estate or they are leading close to the border of each municipality. Older roads, which were not very long, lost their importance. At the time of mapping they were be plotted as a dashed line.

Cattle tracks

Maps of II^nd Military survey are very suitable for identification of cattle tracks. These objects are usually drawn as a narrow strip of pasture.

Hidden relics (often buried)

Hidden relics can be easily identified from aerial photographs or images taken by remote-controlled models, with help of vegetation, soil, snow and shadow signs. The most significant signs are vegetation signs.

Other stuff which can be found in historic landscape is, for example visible relics of roads (hollow ways, hollow bonds) or ravines. Maps of Czech federation of orienteering and Base Map of the Czech Republic ZM10 are most suitable for these purposes.

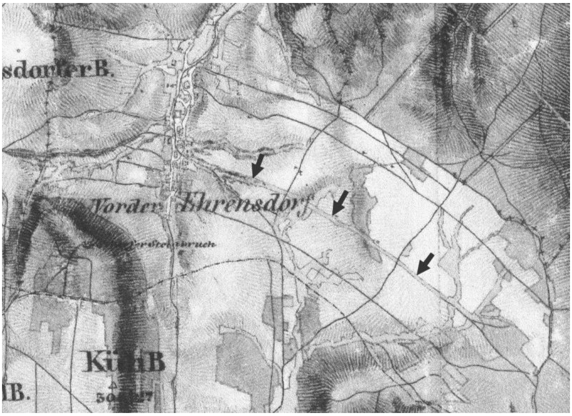

Fig. 1: Map of IInd Military Survey - identification of cattle tracks.

Paraglider model PIXY

The Drone PIXY is a slow moving model of motorized paraglider primarily used for close-up remote sensing, providing classic and digital aerial images and video recordings at ultra-low heights (50–500 m). The model allows the acquisition of traditional and digital images, including video recording. Maximum loading capacity allows having several sensors on the board at the same time. The Drone Pixy concept offers simple piloting, easy transportation, high resistance of the device and its wide use. Operating of the device does not require a special licence. Based on legislation in the Czech Republic, it is considered to be an ordinary airplane model.

Pixy Vision is equipped by Zenoah 290 engine with 2.6 HP. The payload equals 6 kilograms. It allows carrying cameras and other equipment at the professional level.

PIXY Vision model has very good flight characteristics. Wireless range of the communication unit ends farther than 2 km. The flight possibilities are limited mostly by weather conditions. The maximum speed of wind should be from 3 to 35 km/h.

PIXY can also take-off in windless conditions, but the wind shortens the take-off. The model is little bit sensitive to side and gusty wind due to its low weight (about 10 kg) and due to a relatively large wing. The model has a 1 litre fuel tank, which is sufficient for one hour flight.

The model uses a ground station for the flight control. The station is equipped with a small LCD monitor which shows the screen from camera placed on PIXY. The function providing a Live View of camera enables us to observe the area of interest during the flight. The station is equipped with RCA output. LCD glasses can be connected- for a better control during imaging. The station can be connected with the PC. A built-in GPS module enables to track the current location and movement reports. The GPS module also enables us to navigate the model by keeping the track on monitor with underlying a map of the area. Targeting to the area of interest is then more accurate.

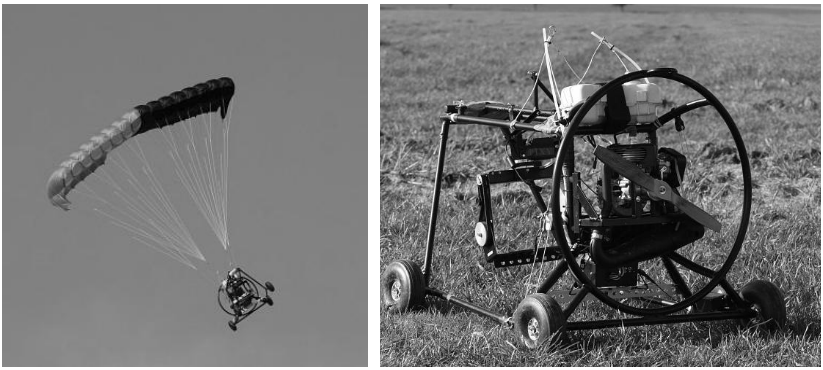

Fig. 2: Drone PIXY model. Left: the model during a flight. Right: detail of the engine part.

The Pixy Vision model is equipped with a constant flight level module. The model still keeps the same altitude after the activation. The principle of the module is based on the GPS height measuring. It is necessary to use the module to keep the same height during the flight.

IDENTIFICATION OF THE PATH RELICS IN THE IMAGES TAKEN BY THE MODEL

Identification of cross-section of a buried hollow way

- orientation of camera for imaging should be approximately in the direction of the axis of the hollow way
- higher obliqueness of the final image is better for identification of hollow way (the shape of the cross-section of buried hollow way is more visible)
- ideal state of vegetation: early stage - the crop is in the process called "sowing"
- spacing of crops should be perpendicular or oblique to the buried hollow way (to identify the cross-section can be also used the boundary of two parcels)

Vegetative signs

The green phase is the ideal state of vegetation. Crop is usually taller and darker over the buried hollow (it is best seen on cereals, but other suitable crops are, for example alfalfa, peas, sugar beet and oilseed rape). It is also possible to take a picture of with cereals in the ripening stage of a grain. Crops over the hollow way remain green (they are supplied with more water) contrary to the neighborhood which turns yellow. The crops are more mature and stems are bent. In direct sunlight, stems seem to be lighter in comparison with the others.

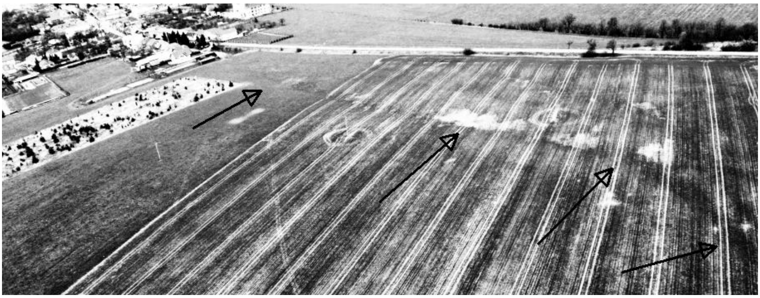

Fig. 3: Historic path identification based on vegetative signs.

Soil signs

Ideal time for taking images is the period when the soil is without any vegetation (spring or fall or 1–2 days after rain). Side walls of hollow way can be distinguished if the mild depression is in the axis of the hollow way (wall oriented to the north dries more slowly and stays darker).

Fig. 4: Historical paths identifiable based on soil signs.

Snowy signs

It is ideal to take images during the snow defrosting. In the stripe of buried hollow way, snow remains longer. It has two reasons. There is usually minor depression in the hollow way area and it creates a snowdrift. The snowdrift melts more slowly than the snow on in surrounding areas. The second reason is the waterlogging of hollow way area. Temperatures are usually slightly above 0 °C, which can also result in slower melting of snow (frozen soil with high water content defrost significantly slower).

Fig. 5: Areas of the historical paths (A, B) identified by snow signs.

CONCLUSION

North Moravia and East Bohemia are areas with the highest number of the historical paths relics. These areas are absolutely unique not only in the Czech Republic, but also in Central Europe. There are more relics in these areas than the famous and the most remembered Golden Path. This is the reason why it is important to make an archaeological survey there. This survey should document the locality and propose some preserving methodologies. The situation must be solved before the relics will be destroyed by heavy forestry equipment. Paraglider model PIXY is one of the ways to promote this research. Using of PIXY to identify historic paths is a highly effective method of research and it can bring new valuable insights into the field.

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Rekonstrukce historických cest s využitím maloformátového snímkování

Oblast severozápadní Moravy a východních Čech je, co do počtu dochovaných reliktů starých cest, naprostým unikátem nejen v národním, ale i středoevropském měřítku (je zde dokonce mnohem více reliktů, než na dnes nejznámější a nejvíce připomínané tzv. Zlaté stezce). Je proto velmi žádoucí, aby se zde uskutečnil důkladný výzkum, který by nejen zdokumentoval, nýbrž také navrhl způsob ochrany vybraných reliktů. Tento problém by se měl řešit skutečně zavčas, dokud nebudou relikty postupně zničeny těžkou lesní technikou, což je stále více aktuální problém nejen pro tuto vymezenou oblast.

USING GEODATA AND GIS METHODS FOR THE ASSESSMENT OF INDUSTRY RATE IN THE LANDSCAPE

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Abstract: *The industrial landscape turned to the post-industrial when many plants and factories were closed and left. GIS methods and data available for the Czech Republic territory can be used for the post-industrial landscape identification and delineation. The article presents the attempt to identify both the industrial and post-industrial landscape indicators by GIS evaluation of existing data. For its recent mining and industrial history, the Oslavany-Rosice region was chosen as the model area for new methodology testing.*

Key words: *post-industrial landscape, GIS methods*

INTRODUCTION

The Czech Republic is one of many countries in which especially in recent decades can be seen the transformation of industrial landscapes into post-industrial. Extraction of natural resources, changes in industrial production, factories closing, leaving large and small industrial complexes, their dilapidation and finding new functions for these objects, the impact on employment of the population in the region, reclamation and revitalization of the landscape represent only a fracture of phenomenons we can meet in post-industrial landscapes. The authors asked themselves whether or not it is possible to use data potential of the Czech Republic (Czech Republic owns a plenty of nationwide geographic data with different attributes) and together with GIS tools and methods to get results that would be helpful for post-industrial landscapes identification or determination of the industry rate in the landscape.

ASSESSMENT OF THE INDUSTRY RATE IN THE LANDSCAPE OF THE CZECH REPUBLIC USING GIS METHODS

GIS method searching sites containing basic attributes of postindustrial landscape is based on assigning point values for each feature to a square of area network. With the increasing number of points (it means the number of surveyed features in the square) increases the sum and also the industry (post-industry) rate. Areas with maximum sum form the core of the industrial or post-industrial landscape evaluated according to selected attributes which are currently available in geodatabases for the area of the Czech Republic.

The method was tested in the Rosice – Oslavany region (Fig. 1). It is a past mining area with abandoned power plant and the number of residues connected with coal mining and burning (dumps, railway sidings, tailings ponds, brownfields, etc.).

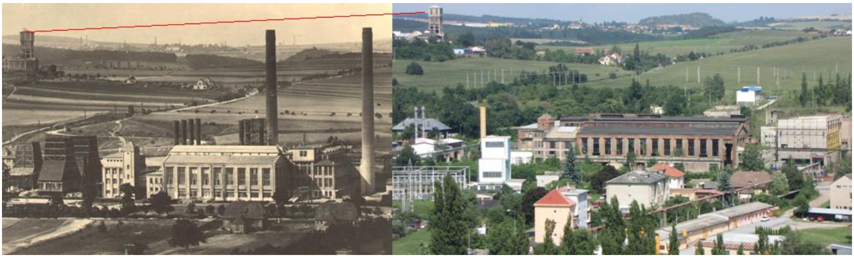

Fig. 1: Oslavany in 1920 (left image) and 2010 (right image) with a mining tower (left upper part) and a power plant (at the bottom). On the horizon of the right image you can see a waste rock dump in Zbýšov area – not present in the left image.
Author of the right image: Svatoňová

For the model area were used geographic data available for the Czech Republic:

- abandoned areas after industrial or agricultural activities, named brownfields (CzechInvest database, regions database),
- typical objects for industrial activity: factories, smokestacks, warehouses, railway sidings, tracks, dense network of roads, petrol stations, (ZABAGED database, DMU 25, GEODIS),

- anthropogenic relief forms built by the previous use of land, industrial clusters, urban, communication and montane landforms (ZABAGED database, DMU 25, GEODIS),
- devastated areas (the technical limits of the territory, regional database),
- reclaimed areas (the technical limits of the territory, regional database),
- objects from land use map/land cover types of built-up area, industrial area, agricultural area (GEODIS database, CORINE),
- necessary industry components which predetermined the landscape to the industrialization involving following natural sources - deposits of black or brown coal, iron ore, non ferrous ore, water resources, etc. (database of the Czech Geological Survey).

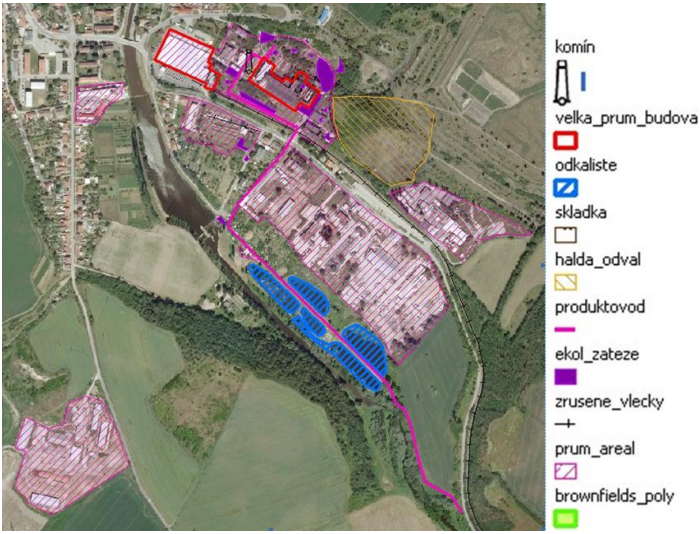

Fig. 2 Visualization of used data applied in Oslavany city – in the area of past power plant and ash dump

METHODOLOGY VERIFICATION OF POSTINDUSTRIAL LANDSCAPE OF ROSICE – OSLAVANY REGION DELINEATION USING GIS METHODS

The territory of municipality cadastres of Oslavany, Rosice, Zbýšov, Babice u Rosic and Kratochvilka was covered with a square network of side length of

100 m. Layers including features with industrial attributes such as a large industrial building, ponds, dumps, heaps, pipelines and chimneys were chosen as data source indicating the industry rate in the landscape (Fig. 2). Each feature incidence was considered and evaluated by points and the final sum of values in the range from 0 to 5 points represented different industry rate. Area assessment including post-industrial activity indicators (brownfields, devastated areas, reclaimed areas) was evaluated by the same way using values in the range from 0 to 3 points. Results can be seen in Fig. 3.

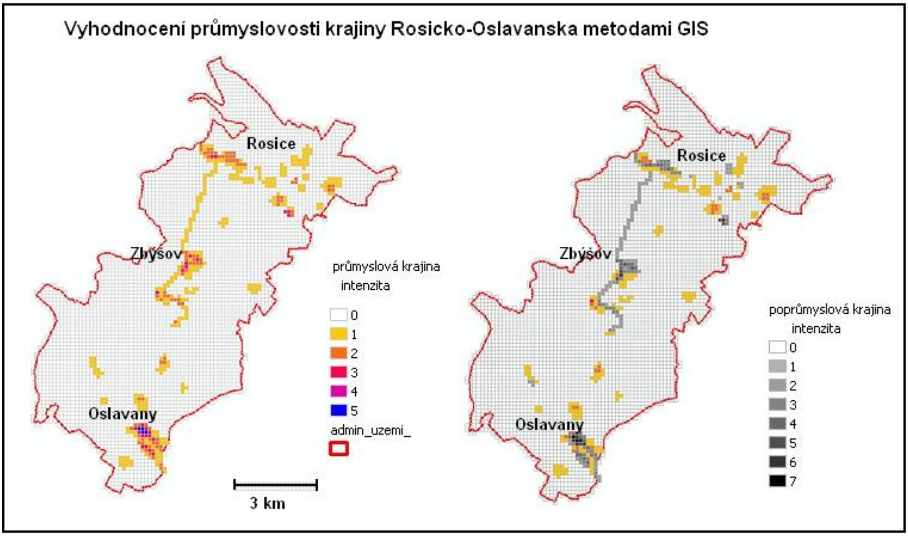

Fig. 3 Definition of industry rate and post-industry rate in the landscape of Rosice – Oslavany region
Authors: H. Svatoňová and V. Plšek

CONCLUSION

The authors presented the possibilities of using modern GIS methods for specific area delineation using data available for the Czech Republic within area industry rate or post-industry rate assessment based on the number of selected objects incidence in a study area. Heaps, dumps, chimneys, railway sidings and industrial objects were chosen as objects identifying the final industry rate as well as features that indicate the end of industrial production (reclaimed areas, devastated areas, brownfields). For successful analysis is important to note that official databases are incomplete.

The question of using other available geographic features which can be used for identification of post-industrial landscapes cores remains. Also it is considered how to solve the problem with inaccurately positioned data.

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Využití metod GIS a geodat pro stanovení míry industriálnosti krajiny

Autoři představili možnosti využití moderních metod pro jejich vymezení při využití GIS nástrojů a dat dostupných pro území České republiky pro hodnocení míry industriálnosti či postindustriálnosti území na základě počtu výskytů vybraných objektů v hodnoceném v území. Jako objekty - identifikátory průmyslovosti byly v testovaném území zvoleny haldy, komíny, vlečky, průmyslové objekty) stejně tak i prvky, které svědčí o ukončení průmyslové výroby (rekultivované plochy, devastované plochy, brownfields). Pro úspěšnou analýzu se jako klíčové jeví neúplnost a nepřesnost oficiálních databází.

Otázkou dalšího výzkumu zůstává, které další dostupné geografické prvky lze k vyhledání jader postindustriálních krajin využít a jak se v hodnocení velkých měřítek vyrovnat s mnohdy nepřesně lokalizovanými daty.

GEOINFORMATION SYSTEMS FOR MEDICAL DATA VISUALIZATION

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Abstract: *Post shows how to obtain medical data and its subsequent processing using GIS and visualization in the form of a series of maps. The first part deals with various freely available sources of medical data in the Czech Republic and in the world with an emphasis on their spatial aspect. The second part of the article deals with the evaluation of software products for suitability for displaying medical data with regard to their specificities and the possibility to use cartographic means of expression. The result is a series of maps of selected infectious diseases in the Olomouc region.*

Key words: *medical data, cartography, maps of infectious deseases, seareas of maps*

INTRODUCTION

To obtain quality data and especially for free is a problem in any field of human activity. In healthcare, this problem is all the more poignant that it relates to the narrowest of privacy for each of us and the collection and archiving of data are subject to very strict control. Still, it is possible to obtain relatively high-quality data for analysis of disease, availability of medical care, even the cost of national health care all over the world. What data concerning the Czech Republic and foreign data can be obtained, summarized in the following lines.

MEDICAL GEODATA

Any data enriched with a spatial component, it means a spatial data (also called geographic data and geo-data), are the basis for spatial processing, creating the map outputs, the implementation of spatial analysis and modeling, etc. This spatial component of data is nothing else than the location of the alert to a specific position in space. The easiest way is to define the geographic coordinates. Geodata may to some extent be the records with information on the location to which they relate, such as address, name of the village or even district. Geodata and medical records may contain the location of health facilities or data on the number of patients in the municipalities. For the processing of such data is then used geographic information systems and geoinformation technology.

BARRIERS IN PROVIDING AND DATABASES

The health care is very sensitive to data privacy. Generally, the larger spatial scale of medical geodata, the more inaccessible they are. The accuracy of the spatial component of geodata is their biggest priority in analytic processing. In the Czech Republic there is a rule about data providing: there will be impossible to find out whitch persone bellongs to certain personal data. Cutting off name, surname, identity number and other personal data is a logical solution. However in praxis it is used providing data whitch are aggregated into larger units, for example the most frequently the lowest administrative unit is the administrative district of municipalities with extended powers.

In addition to protection of personal data, the data accuracy and usability is influenced by many other factors: rarity of disease, localization of infection or poor statistical relevance of data.

DEPARTMENTAL DATA SOURCES IN THE CZECH REPUBLIC

Institute of Health Information and Statistics of teh Czech Republic (UZIS)

It was established in 1960. It is an organizational unit of the state and it is established by the Ministry of Health. UZIS and its role is defined by Act No. 20/1966 Coll. Health Care, as amended, § 67c[1].

Institute collaborates with hospitals, doctors' associations, professional medical societies, insurance companies and other organizations at the international level, the institute collaborates with the WHO, OECD, UN, EUROSTAT and others. It is therefore most important provider of nationwide data on health status [2].

National Health Information Systém (NZIS)

It is an unified national information system designed for the collection and processing of medical data and information on the population's health, on medical devices, their activities and the economy [2]. NZIS also leads national health registers (eg the National Register of admissions, the National Cancer Registry and National Registry of Occupational Diseases). Next, NZIS provides information to the extent specified in the law respecting the conditions of data protection and recovery of information in medical research [1].

Data Presentation System (DPS)

It is one of the available data presentation applications. The program is designed for users who are interested in health and health situation in the regions of the Czech Republic [2].

The National Institute of Public Health (SZU)

It is an agency of the Ministry of Health. Its position and duties are set out § 86 of Act No. 258/2000 Coll. On the protection of public health and amending some related Acts, as amended, and measures the Minister of Health Ref: 31334 / 20020 of 17 12th 2002 [3].

NIPH is a medical facility and is authorized to process for the preparation of documents for public health policy making and monitoring of long-term trends in infectious and other diseases [2].

The National Institute of Public Health is responsible for implementation and management of epidemiological databases EPIDAT. Program EPIDAT serves to ensure mandatory reporting, recording and analysis of infectious diseases in the Czech Republic. Reporting of infectious diseases is the basis for local, regional, national and multinational control the spread of infectious diseases and for reporting infections from the Czech Republic to the Community EU and the World Health Organization [2].

STATISTICAL DATA SOURCES

Czech Statistical Office (CSU)

It is the state authority of the Czech Republic, providing collection, processing and publication of statistical data. CSU also coordinates the collection and processing of statistical data carried out by individual ministries. Medical data are available on the website of the office and they are provided only for the whole Czech Republic, the data at a lower territorial units are available only on request. The data are in the form of tables, text and graphs, and contain information for example about medical devices, accidents of children.

The European Statistical Office (EUROSTAT)

Provides statistical data of the Member States of the European Union. These data are used to compare countries and regions of the European Union. EUROSTAT was founded in 1953 and its headquarters are in Luxembourg [2].

OTHER DATA SOURCES IN THE WORLD

World Health Organization (WHO)

The organization collects a large amount of medical geodata worldwide. WHO also handles a large amount of statistical data, these include monitoring of indicators such as population health indicators, health systems assessment of individual countries [4].

Data from the World Health Organization are concentrated in four databases: WHOSIS, WHO Global InfoBase Online, Global Health Atlas and Regional Statistics. Data are available mostly in the form of visualizations - charts, maps and summary tables.

European Health for All database (HDA-DB)

It is a central database of independent data of base health statistics. It contains time series since 1970. The database is updated twice a year and includes about 600 indicators for 53 member states in the region of Europe.

Organisation for Economic Cooperation and Development (OECD)

Collects and provides important information not only of economic nature. In addition, it maintains the Health Statistics a database of medical data of the Member States [5].

The above databases are only selected sources of health data. This is a summary of the best known and most frequently using thematic databases, which usage is free for non-commercial purposes. To provide other such detailed data is necessary to ask directly to the institution and also because the data can be, and usually are, for a fee.

VISUALIZATION OF MEDICAL DATA

EVALUATION OF SOFTWARE PRODUCTS

To evaluation of vizualization tools has been selected six programs: ArcGIS 9.3, ArcView 3.2, HealthMapper, Geomedia Professional, 2.11 and Christine GIS InstantAtlas. These programs offer a wide range of options and tools. One of them is the map creation. Each of these programs has different tools and offer a variety of predefined methods for cartographic visualization.

All the tested programs allow to create a pseudo/cartogram, diagram maps, character method and method of combinations of this methods. The dot method and the possibility of combining the previous methods with this method is find in the programs ArcView, ArcGIS and HealthMapperu. To create isolines and dasymetric interpolation method is needed and it is only possible for programs ArcView, ArcGIS, GIS and Christine Geomedia Professional. Anamorphosis as a single method can not be constructed even in one program.

MAP MAKING OF HEALTH DATA

A collection of 24 maps was created in the coordinate system S-JTSK and map scale 1: 500 000. For the creation of maps were used program ArcGIS 9.3 by the ESRI with ArcInfo license and for subsequent treatment were used CorelDRAW Graphics Suite 9.

For visualization of the data was chosen only pseudocartogram method, cartodiagrams and their combinations. These methods were selected as suitable for display characteristics of the infectious disease.

Medical data consisted of infectious diseases from a database Epidat: Salmonellosis, Viral intestinal infection, Lyme borreliosis, Tick-borne encephalitis, Viral meningitis, Varicella, Viral hepatitis A, hepatitis B Virus, parotitis, Scabies

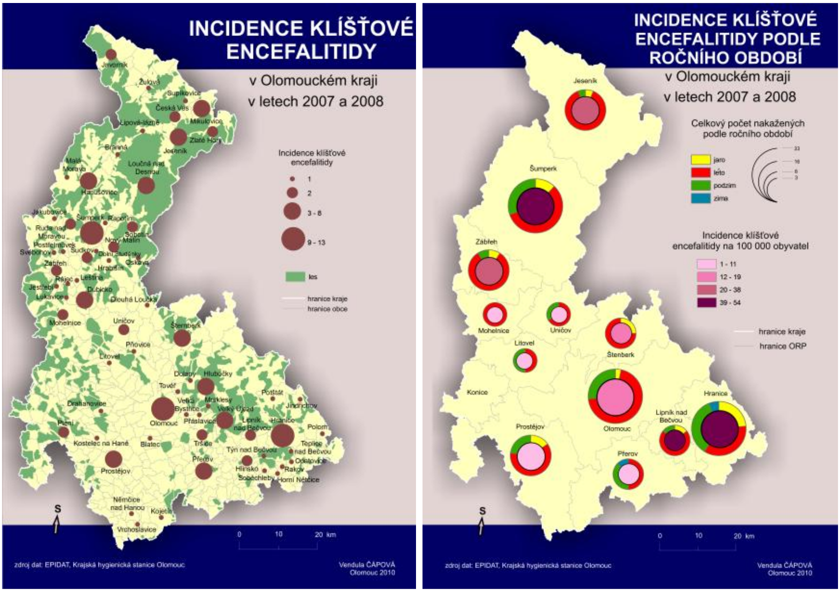

Fig. 1: Circular cartodiagram with dasymetric method and Structural circular cartodiagram

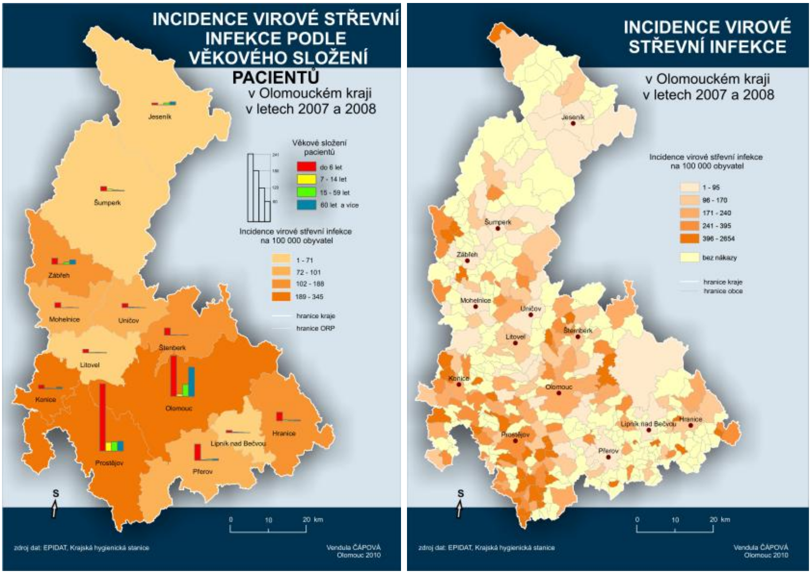

Fig. 2: Bar cartodiagram with pseudocartogram and pseudocartogram

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Geoinformační systémy při vizualizaci zdravotnických dat

Příspěvek ukazuje možnosti získání zdravotnických dat a jejich následné zpracování pomocí geografického informačního systému a vizualizaci ve formě série map. V první části se zabývá různými volně dostupnými zdroji zdravotnických dat v České republice a ve světě s důrazem na jejich prostorový aspekt. Druhá část článku se zabývá hodnocením softwarových produktů z hlediska vhodnosti pro zobrazení zdravotnických dat s ohledem na jejich specifika a možnosti použít kartografických vyjadřovacích prostředků. Výsledkem je série map výskytu vybraných infekčních onemocnění v Olomouckém kraji.

IMPACTS OF CURRICULAR REFORM ON GEOGRAPHIC EDUCATION

WHY TO LOOK BACK IN HISTORY

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Abstract: *Geographical education is the beginning of all geographers. Let's find out how it has changed. The most progressive document (Framework Educational Program) is being revised. Who is taking part in it?*

Key words: *geographical education, geographical standards, curriculum*

INTRODUCTION

The first historical look into the past is into the history of this conference. Paradoxically, it was founded in the year when the Czech and Slovak Republic fell apart. Therefore, it is the oldest geographic conference within the two newly formed states. Good will and never ending friendship of the geographers in the divided republics were present at the birth of this conference. One of trends in current geography is to respond to a changing world. Due to this, the orientation and titles of the conferences have changed. We will not name them, but will only mention the first one - "Teaching Geography of the Czech and Slovak Republic in the Context of New Conditions of Development". Already the title suggests that its character was initially focused on education. When we try to recall how many plenary contributions in recent years were devoted to geographic education, we need not wait long for an answer – none. And so we must thank the organizers that this year was helpful to geographical education. Although the title suggests it might be an historical overview of geography teaching and curriculum development, in fact it was not. We chose only the last 20 years from the more than 200 years of the history of geography teaching at schools in the Czech Republic. We are interested in particular issues which we cannot answer. They concern not only the content dimension of the curriculum, but especially the people who create the curriculum and, in particular, how the methodology of geography, science and teachers of geography are involved in the process of curriculum innovation. Sometimes the discussion on this topic turns into playing with concepts. Let us agree that for this article we will use the word curriculum in relation to the content dimension of geographical education. Influences of philosophical concepts are purposely not included.

Before reading this text, consider following questions:

- How has geographical education at elementary schools developed since 1989?
- Who was the author of the geography curriculum and what was the role of the educational department of the Czech Geographical Association?
- How was the academic community involved in the development of the geographical curriculum?
- Did the academic community discuss the aims of the geographical curriculum?
- Who is the real author of the content of the curriculum?
- How will the academic community take care of the future of geography?

HOW HAS GEOGRAPHICAL EDUCATION DEVELOPED SINCE 1989?

The social changes which occurred in the early 90's of the 20th century were also inevitably reflected in geographical education. Topics of a political nature, especially elements of Communist education, were removed. After the breakup of Czechoslovakia our students got less and less information about neighboring Slovakia. In response to the changed political climate in Europe, and especially our redirected relationship to western European countries and integration, a European dimension has been gradually incorporated into the curriculum content. The encyclopedic concept of teaching, descriptive approach and the overall amount of information given have still been criticized. In the 1995 Standards of Elementary Education (1995) the specific aims of teaching geography were introduced and a basic curriculum content was specified. In 1996 the Standards of Grammar School Education was published. The content of the presented standards contained elements of previous curriculum documents, although the document was enriched by elements written in the International Charter on Geographical Education (Haubrich, 994). None of these documents had any fixed structure and all were formulated very generally. Total liberalization in education also led to codification of other educational projects – curriculum of Elementary School and National School. A number of new textbooks also started to appear.

At the beginning of the 90's two important documents appeared in the field of geographical education the International Charter on Geographical Education and the National Geography Standards. In addition to a completely different concept of educational aims and standards built on a general principle (what should the geographically educated person acquire), they brought us another concept – geographical thought. It should be noted that the authors of the Czech Standards of Elementary Education had not considered these documents. These documents are at least used in lectures concerning the methodology of teaching geography. A new concept of geographical education containing broader approaches to curriculum reform has been discussed since 2001. The reform is aimed toward implementation of innovative teaching approaches, methods and forms that would actively engage students in their education and prepare them for using their acquired knowledge in real life. This would shape their personal attitudes and opinions.

In determining the educational content of the subject of geography in the upcoming curriculum document (Framework Education Program - FEP), the authors used the concept that mirrors the development of the subject as outlined in the preceding text. Aims formulation, respectively expected outputs are based on the traditional classification of geography branches and compared to the past, the education is focused on specific work with curriculum content. If we compare the aims and contents of geography education as defined in the FEP to the aims and content reported in project "Further Development of the Educational System (1976)", it should be noted that the FEP does not come up with new reform approaches on questions of the direction of geographical education.

Final curricular reform still faces one aspect which is appropriately stated by Ondrej Šteffl in his article:

"There is a whole group of other causes leading to the deterioration of results at schools. Our generation does not understand these causes. Perhaps that is why we often ignore them. Their influence on the decline of the school is huge. The world surrounding the school changes. It changes faster and faster. However, the school changes slowly and, thus the education meets the needs of the past and increasingly moves away from the needs and demands of the current and, especially, future world. Pupils and parents realize that the school does not offer that which will prepare children for their future life."

The common characteristic of all current curriculum reforms is that they are not time-limited, they will be permanent and it is necessary to prepare students (future teachers) for them.

Who was the author of the geography curriculum and how has the Czech Geographical Association (CGA) (its educational department) contributed to the creation of this document?

We are on very thin ice with this issue. Have a break for a while. I liked Prof. Demek´s lecture organized for his jubilee. It is titled "Geomorphology and geomorphologists". When I briefly talked to him he told me that he was speaking only about those who are not among us. The authors of the FEP are among us and we do not want to insult them. The truth is that we do not like their concept of curriculum. Excessive radicalization of opinions and a lack of communication between the sciences and the broader geographical community kills the discussion and. What a team of authors in the U.S. managed in 10 years, our ministry wants within 6 months.

What was the involvement of the academic community in the development of the geographical curriculum?

Have any discussions dealing with geographical education aims taken place within the academic community?

For many years we have not been able to make the individual departments of the CGA cooperate. We have tried to define the basic goals of geographical education based upon our own and foreign documents. Some of them were published in the proceedings. But we have not developed them. We have not discussed them. They are so poorly defined or nobody cares about them. But this year, when we had the opportunity to work on a partial reform of the FEP we appreciated them. Before we can achieve any result we have to determine where to go. We hope that our possible opponents will show us our mistakes and we will be able to move forward.

Ondřej Šteffl for a second time

"Nowadays pupils at schools need more help with searching, verification and importance and relevance assessment. When analyzing information they need support in putting knowledge into a context and information linking during synthesis. Especially, they need to learn how to do it themselves (without help) - and for that they need to create structures of thought."

Who is the real author of the current curriculum?

The answer is teachers. According to a questionnaire survey and structured interviews with 50 elementary school teachers, the real authors of the curriculum are the authors of the textbooks used at schools. I was surprised by the answer of one author/teacher? about the geography teaching concept at one elementary school: "It has always worked this way, so why shouldn't it continue?."

How will the academic community take care of the future of geography?

Here I mean the care of talented youth. It seems everything is OK. The Geographical Olympics have taken place since 1998. The best students have participated in the international competition organized by the IGU since 2002. The European competition CERIGEO started in 2003, and since 2009 we have taken part in the contest organized by National Geographic Magazine. University students can compete in a contest of the best student scientific work. It is necessary to note that the Department of Geography at the Faculty of Education in Masaryk University supports most of the above-mentioned activities. In conclusion, it would seem that everything is OK. But it is not. We are still missing the involvement of all of the university departments in these activities.

CONCLUSION

When you read some curriculum, sit down, take a breath and let us know your progressive thoughts. We assure you that we will hear you. Geographical education needs, first of all, widespread communication.

Proč se dívat do minulosti

Ať chceme či ne, minulost si neseme každý v sobě. Příspěvek představuje autorův pohled na geografické vzdělávání především v uplynulých 20 letech. Poukazuje na některé příležitosti, které geografické vzdělávání v české republice dostalo a na jejich využití. V neposlední řadě je to např. role vysokoškolského vzdělávání v současné školské reformě, pedagogického výzkumu v didaktice geografie nebo práce s talentovanou mládeží.

INTEGRATION OF STUDENTS TO MODERN VISUALIZATION METHODS RESEARCH

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Abstract: *Study programmes at the Faculty of Business and Economics Mendel University in Brno were recently rebuild. Graduate skills, knowledge and competences were re-defined during the reconstruction. This article outlines the connection between different computer graphics and GIS courses in bachelor's and master's study programs. The article also describes the students integration to the applied research in the area of GIS and modern visualization methods.*

Key words: *skills, knowledge and competence of graduates; visualization; geographic information system; user interface; computer graphics*

INTRODUCTION AND AIM OF THIS WORK

At the Faculty of Business and Economics of the Mendel University in Brno are accredited study programs Economics and Management, Economic Policy and Administration, System Engineering and Informatics and Automatic Control and Informatics. The study is carried out in all three degrees (bachelor's, master's and Ph.D.'s). Every study program, subject area and specialization has its specification of graduates skills, knowledge and competences. All courses are designated only for one study degree and must fulfil the specification of given study program, subject area and specialization.

Amount of course credits is given by the approximate study time consumption. The value of one credit is 26-30 hours of student work. Some of the courses are taught in different specializations, even in different study programs (e.g. GIS are taught within computer science programs and also economical programs) [1]. Geographic information technologies education stared at FBE MENDELU in 1998. Computer graphics programming education started in 2004.

Currently we have one bachelor's and one master's specialization focused on modelling and visualization. In both of them plays the GIS courses a significant role. The aim of this article is to discuss the possibilities of students integration to the applied research in the area of modern visualization methods and present our GIS education approach.

RESOLVING APPROACH

Before it was possible to discuss the courses content, it was neccessary to study the skills, knowledge and competences of all involved study programs. Then we could define what topics could fulfil them from the GIS point-of-view (GIS as the important part of the many science areas including many economic processes [9][11]) and also possibilities of the students participation, in accordance with on-going research. Finally, it was possible to select appropriate education methods and tools for study personalisation (according to the study specialization).

We use different methods and approaches during the education process. We are aware, that students are able to remember only from 20 to 30 % that they hear and see, but from from 80 to 90 % of the things that they are forced to formulate or to create. Therefore, we try to use the method of student activation [3] – discussion, problem solving, illustrated demonstration, presentation prepared by the students, etc.

We are also convinced, that an inseparable part of the course content design is the students feedback. After the teaching period it is necessary to make the conditions for getting an objective feedback. For us, it is possible to get the reactions by discussion during last lessons, by written questioning or from the University Information System evaluation module. Although the evaluation could be sometimes partially uncomfortable, it is necessary to consider especially constructive suggestions and accordingly adjust the teaching process.

SOLUTION AND CONCLUSIONS

Geographical information systems are taught within the bachelor's study specialization Graphics and GIS and on master's level within specialization Graphics and its applications. Quite obvious is the interconnection of GIS with land-use planning or urban development, forestry, facility management, etc. But on the first spot there is just a little common for areas such as GIS, computer graphics, human-computer interfaces and advanced visualization techniques (such as virtual or augmented reality). The opposite is certainly the true. We could start with state-of-the-art GIS trends: augmented reality based personal navigations (e.g. well-known *Layar*), location based services using the image processing for refining the position and even with the ability to augment the scene image with appropriate geodata (see augmented reality guide in [8]) and many others. These applications clearly presents the overlap of different computer graphics areas into the GIS. We are trying at least partially to present this interconnection also within our courses.

On the bachelor's level the main courses has more than 100 students each semester. One of them is the Geographic Information Systems course. It is focused on students in the second year of bachelor's study program. The aim of the course is to present the basics of GIS and encourage the students to further study of this area. Lectures are common for students of technical and economical programs. Students are divided for computer seminars. The seminars content is slightly adjusted according to the study program. Seminars are based especially on different case studies. Also the supporting study text for lectures and seminars is prepared separately for both student branches. Approximately 70 % of the content is common, the rest is special for the program.

The other courses (e.g. Social and economic applications of GIS) have usually up to 25 students per semester. This allows an individual approach and involvement of students into the applied research. Seminars are taught in specialized GIS/graphics laboratory and in the Laboratory of Virtual Reality [4][5].

During the education process we frequently face the problem that students are accepting a huge amount of information with just a vague idea of the application on real problems or interconnection with other courses. This situation must be solved. It is necessary to give them knowledge, skills and competences that overcome the university studies. The meaningfulness of the course is easily presented using the real case studies and involvement into mentioned applied research.

In the GIS area is for this purpose suitable the government that is overwhelmed with many land-use management tasks and it is not able to solve this situation both from the personal and the knowledge point-of-view [2]. Therefore we encouraged people from involved government departments to formulate selected problems for the students. On the beginning there were doubts about the student’s potential. Furthermore it was necessary to taught the clerks how to clearly specify the problem, especially how to split the complex problem into partial tasks and how to communicate with the students.

After we overcame these problems we gained extremely positive feedback from the clerks and interesting reactions from the elected representatives, especially in the situation when the results were not in correspondence with their opinions.

The GIS project starts with consultation about selected problem. Follows self-study phase and a fieldwork. Up to this point are students usually quite satisfied. They attend quite attractive lectures and read interesting books. After these initial phases usually follows panic. They must interconnect knowledge from different areas, even thou the connection is not obvious. Sometimes they are not able to split the problem on partial tasks and they are simply afraid of their incompetence to solve such complex problem. Fortunately at the end they usually find an appropriate approach and quite often are consumed by the project. They are even dissatisfied when consultant is not able to communicate as fast as they want to. Presentation of the project is surely accompanied by some amount of nervousness, however at the end they are satisfied.

If we summarize the basic gist of courses and projects on bachelor's study level, they are mostly focused on appropriate usage of existing sources and applications to solve selected real and complex problems.

Master's level study specialization Applied graphics is focused primarily on the development of different (geo)graphical applications. Therefore we are focused on interconnection between GIS courses and graphical courses such as Advanced user interfaces and Laboratory of Virtual Reality. As been mentioned before, many state-of-the-art solutions are based on access to appropriate geodata as well as on user-friendly interface. Therefore, only knowledge of both of these areas could be a good basis for development of these innovative applications. GIS education is on master's level extended by the course Animation and geospace focused on 3D visualisation of selected area. Computer graphics courses are following: Computer Graphics 2 outlines OpenGL application development and basics of image processing, Advanced User Interfaces are about design of state-of-the-art and user-friendly applications and finally course Laboratory of Virtual Reality is focused on development of bigger projects (usually connected to the master thesis).

Advanced visualisation techniques and related image processing research is in our laboratory focused primarily on augmented reality. It was chosen because of its enormous potential to be adopted as a common tool in many different processes, especially in the GIS area (personal navigation, location based services, field measurement, etc.). Interconnection with praxis is given by a project with Škoda Auto company aimed on development an augmented reality design tool [6][9]. Among this tool, other projects are under development – e.g. augmented reality in mobile mapping.

However, there is a significant problem in this area. The amount of necessary computer graphics knowledge, programmer skills and generally intelligence is quite high. Just a small number of our students is able to fulfil the criteria to be a valuable asset for the project. On the other hand, this project is utmost important for highly talented students. It gives the possibility to solve a complex problem and use meaningfully their potential.

In the first phase of the project there was a large number of student that were attracted by this project topic. However, they did not realized fully the requirements. This led to many bad solutions [7]. In further phases participated smaller groups of students, but with significantly better results.

FEEDBACK

In the GIS we use the methods of discussion at the last lessons to get feedback. From the beginning the students were concerned that their comments had some influence on the exam result. Luckily we managed to dispel these concerns and honestly discuss with students. The feedback is from the „smarter" and during the semester more active students very positive, from an average students is usually positive, and from students without an interest in the course is mostly restrained. The text answers of an anonymous university evaluations also confirm these results of our feedback.

We also realised, that students usually do not see the link between the number of credits and time course load. Some of students complained on too high course time load, on the other hand they reported the number of hours devoted to the course was lesser than it should be according to the number of credits.

The pleasing information was that the most of students rated that they learned a lot of new and on the other hand, that the course was not extremely difficult. Therefore we could conclude that the applied teaching methods and tools have the desired effect.

Similar results we get also from the advanced computer graphics courses. Moreover, the tendency of students to continue on these projects within the Ph.D. studies is clear proof of their meaningfulness.

They make a huge leap forward already during their master's level. At the beginning of the Ph.D. studies they just carry on in the solution of their project. It is not necessary to start from a scratch. Surely, also the complexness of these tasks is a significant asset for successful Ph.D. studies.

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Integrace studentů do výzkumu v oblasti moderních metod vizualizace

Studium na Provozně ekonomické fakultě MENDELU je uskutečňováno v mnoha oborech všech třech stupňů vysokoškolského studia. Některé předměty jsou vyučovány pro studenty více oborů. Problematika geografických IT a souvisejících moderních metod vizualizace má na PEF MENDELU již svou tradici. Příspěvek pojednává o zapojení studentů do výzkumu v oblasti metod vizualizace tak, aby byly v souladu s definovanými dovednostmi, znalostmi a kompetencemi absolventů všech oborů.

Některé předměty studuje více než 100 studentů každý semestr. V rámci nich mají studenti společné přednášky, oborově zaměřená cvičení a oborově přizpůsobené e-Learningové materiály a zadání semestrálních prací. Většinu navazujícíh předmětů z popisované oblasti studuje maximálně 25 studentů, což umožňuje individuální přístup a výuku ve specializovaných laboratořích (učebna geografických IT, laboratoř virtuální reality). Propojení výuky s praxí formou aplikovaného výzkumu jak pro veřejnou správu, tak pro komerční sféru se ukazuje jako dobrý způsob zatraktivnění studia, zvýšení motivovanosti studentů k nástupu a úspěšnému ukončení doktorského studia a konečně také ke zlepšení uplatnitelnosti absolventa v praxi.

V oblasti geografických IT bývají výsledky praktických projektů ve většině případů kvalitní. V náročné oblasti virtuální/rozšířené reality je situace komplikovaná, protože tento výzkum vyžaduje od studentů programátorské schopnosti a další předpoklady. Během práce prochází studenti několika fázemi, od zdánlivého klidu, přes obavy nad vlastní neschopností až po nadšení vlastní prací a úspěchem u zadavatele. Pro vhodné přizpůsobení studia je nezbytná zpětná vazba od studentů, která napomáhá zkvalitnění výukových metod a nástrojů.

WEB DYNAMIC ATLASES CREATING IN TEACHING CARTOGRAPHY

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Abstract: *Teaching cartography and atlas creation is at the Department of Geoinformatics at the Palacky University, Olomouc long supported and developed. Digital cartography is one of the research directions of work and creating maps on the internet is also one of the essential components of cartography lessons. Within the project of the University Development Fund of the Ministry of Education, Youth and Sports Department was purchased InstantAtlas program, serving for publishing dynamic web atlases. The web portal iATLAS was created, where all created atlases are collected and published. In the lessons several web dynamic atlases realized by students of department of Geoinformatics were made. Including Statistical atlas of the Czech Republic, Student map of Olomouc or the spatial visualization or urban planning data of Olomouc implemented into the student project POHOS (Research of citizen movement between urban and sub-urban space in Olomouc region). In terms of the bachelor thesis was made a set of templates for the needs of the department of Geoinformatics and a manual for program InstantAtlas in Czech.*

iATLAS project serves as a freely available source of information of various topics and will continue to be developed and filled in by works especially by students of the department of Geoinformatics of the Palacky University in Olomouc.

Key words: *cartography, web cartography, atlas, web atlas, geoinformatics, iATLAS, InstantAtlas*

INTRODUCTION

In the field of Geoinformatics and Cartography in the Czech Republic a new tool for creating cartographic outputs and products appeared. Is it InstantAtlas and, as its name suggests, this is a very simple program for publishing dynamic web maps and atlases. In other words we can say that it is an "instant" Atlas, which requires prepared data and a relatively small amount of time spent by the author. Since it is still a creation of a cartographic output, should be considered also to certain principles of each map.

INSTANT ATLAS PROGRAM

InstantAtlas was developed by Scottish company Geowise Ltd.. based in Edinburgh Currently it is offered the latest version 6.5.2 with the designation. The program is built on the Java platform, making it portable between different kinds of operational systems or devices. For proper functionality of the software is also necessary to have installed on the computer Adobe Flash Player version 9 or higher [1]. After that it is possible publicate of its own the individual map data output from the program. It is called "report".

Usage

InstantAtlas is primarily intended for visualization of statistical data of any fields or topics. It is an ideal tool for anyone who stores a number of tables and databases full of data. These data would ve easily visualized in map form and to be posted on the web. The advantage are several templates with different compositional elements and their distribution. Report can contain one or two map fields, preview the input values, tables with statistical indicators or various types of graphs (i.e. linear regression or time series). User can customize each report by selecting template in the process of creating maps, but also by changing or adding to legend graphic element in the map while viewing the final report. A disadvantage is connected with cartograpfical rules. Map outputs from current and previous versions do not respect all of cartographic principles and rules. For example, graphical or numerical scale are still missing in the report. Outputs can not be considered flawless quality cartographic works, on the other hands InstantAtlas can very well serve for quick and effective data visualization for laiks such as for experts.

How Works InstantAtlas

In addition to the software, also geospatial data is required for the publication. Fortunately, today there are many so-called "free" geodata which can be freely downloaded and used. This geographic data can be obtained from web sites such as the T.G.M. Water Research Institute, the Road and Motorway Directorate of the Czech Republic or GRASSwikiCZ [2]. Of course, the program can work with all three types of topology, i.e. points, lines and polygons.

The creation of the report consists of several consecutive steps. The first is a selection of templates, the map composition of the resulting report. The full version offers available seven templates. In next step, the user marks the basic thematic layer. It is followed by definition of statistical data. Other steps are optional. The topography layer can be formed by any other geodata layer, which appears as a vector element in the map, bitmap background, the map server of Google using the Google API or using the services provided by WMS or ESRI maps from any ArcGIS Server. In the last steps of the user defines the output directory and create complete reports.

PROJECT IATLAS

The project iAtlas is a follow-up activity on the Ministry of Education project No. 2788/2010 "Creation of an internet atlas in computer cartography." The aim is to build an atlas server with the results of student work results using InstantAtlas. In addition to presentation reasons, it can serve as the data source for the general public. Ministry of Education project was designed as an upgrade of course "Computer Cartography", in which students deepen knowledge and skills of computer maps and atlases. One of the modern technology of computer cartography is a flash technology. In tne part of the exercise students are creating online atlas of available statistical data of various topics. They first process data from the geographical view. Next, data are visualized in the interactive flash animation form using InstantAtlas program.. Students can try direct connection of vector spatial data with attribute data in the database and transfer them into Flash animations.

The outputs of the project are set of exercises and the web atlas of various geographic topics (health, transport, education, etc.). Both are placed freely available on the internet at http://iatlas.upol.cz [3].

This website serves as a source of statistical data, but also as a source of guidance and information to using the InstantAtlas program. The section of student works can be find here. In addition to the Statistical Atlas there are presented results of other student work results from other subjects used InstantAtlasu program.

CREATION OF ATLASES IN THE EDUCATION

Statistical Atlas CR

Statistical Atlas of year 2008 was created within the computer cartography course which is taught in the winter semester, second year of undergraduate studies. It is compulsory subject for students of Geoinformatics.

Atlas contains the following nine topics: Environment; Population; Agriculture, Forestry; Transport; Labour Market; Industry, Construction, Energy; Education, Science, Research; Health Care, Social Security; Crime, Accidents, Fires.

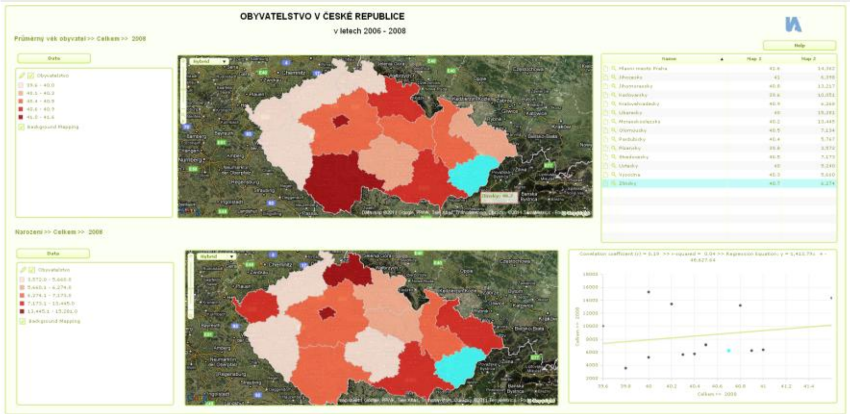

Fig. 1: Statistical atlas CR – Topic of population. Template for comparison of two selected datasets.

Student Map of Olomouc

Student Services Map of Olomouc was created in the subject of Cartographical Project. It is taught in the winter semester of the fourth and fifth year of master's study as a compulsory-optional subject for students of Geoinformatics.

Student map includes points of interest of leisure facilities and services. In the map are add some statistical information relating to the territorial basic settlement units. Student map is divided into two categories: Services and Recreation.

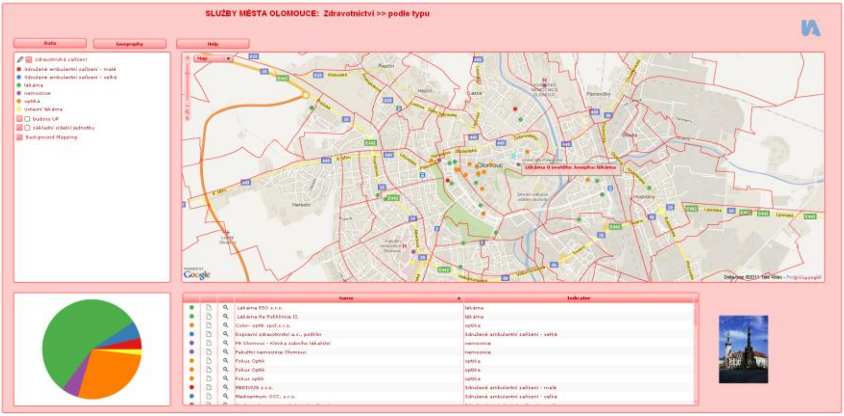

Fig. 2: Student map of Olomouc – Category of services. Simple template of single map.

BACHELOR THESES

Data visualization of the project POHOS

In the thesis "The set of templates for InstantAtlas" originated seven map compositions for different types of thematic maps. Templates were used for the exemplary data visualization of POHOS project.

Templates: Double maps with data for the linear regression; Single map for qualitative phenomena; Single map for qualitative phenomena with chart; Single map for statistical data with the time evolution; Single map for statistical data with time evolution, logically structured; Single map for statistical data, logically structured; Single map representing historical development indicators.

Maps: Time evolution of urban plans; Statistical data; Demographical data; FUA; Historical development; Price map; Development of built-up area; Planning analytical materials; Definition of rural area

Another result of the thesis is manual in Czech language which will help new users.

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Webová dynamická atlasová tvorba ve výuce kartografie

Výuka kartografie a atlasové tvorby je na katedře geoinformatiky Univerzity Palackého v Olomouci dlouhodobě podporována a rozvíjena. Digitální kartografie je jedním z výzkumných směrů pracoviště, a proto je také tvorba map v prostředí internetu jednou ze základních složek kartografické výuky. V rámci projektu Fondu rozvoje vysokých škol Ministerstva školství, mládeže a tělovýchovy ČR byl na katedru zakoupen program InstantAtlas, sloužící k publikaci webových dynamických atlasů a vznikl webový portál iATLAS, kde jsou všechny vytvořené atlasy shromažďovány (soustřeďovány) a publikovány.

V rámci výuky doposud vzniklo několik atlasů realizovaných studenty katedry geoinformatiky. Jsou mezi nimi Statistický atlas ČR, Studentská mapa města Olomouce nebo vizualizace územně analytických podkladů Olomoucka realizovaná při řešení studentského projektu POHOS (Výzkum pohybu osob na styku urbánního a suburbánního prostoru olomouckého regionu). V rámci vypsané bakalářské práce vznikla sada šablon pro potřeby katedry geoinformatiky a manuál programu InstantAtlas v češtině.

Projekt iATLAS slouží jako volně dostupný zdroj informací různých témat a bude i nadále rozvíjen a doplňován především pracemi studentů katedry geoinformatiky Univerzity Palackého v Olomouci.

INTEGRATED SCIENCE FOR TEACHERS OF GEOGRAPHY

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Abstract: *The paper describes the integration of practical knowledge in teaching science subjects at basic school. The new curriculum reform which was introduced in the Czech Republic is based on the necessity of integration and synthesis of knowledge of all sciences. Integrated approach in teaching at elementary schools is justified and irreplaceable, although many teachers do not use it or use it only as a supplement. We focus on some ways that lead to the implementation of an integrated approach in teaching science. We present some supporting materials for teachers in practice. Within the integration of science knowledge, the role of the supporting material, which was elaborated by teachers of science departments at Faculty of Education of Masaryk University in Brno, is to offer to readers the opportunity to synthetic thinking during solving problems of everyday life.*

Key words: *sustainable development, interdisciplinary education, integrated science*

INTEGRATED SCIENCE AND GEOGRAPHY

The new curriculum reform is based on the need of integration and synthesis of knowledge of all sciences. Most of teachers had not an opportunity during their own studies and practice to study their subjects in relation to other subject. Often the only subjects with integrated elements were at the time of their attendance of elementary school subjects as vlastivěda (My country) a přírodověda (science).

Integrated teaching, integration in education, integrated view of teaching, these and many other terms accompany the discussion to current objectives and forms of education, their reflection in state, school and subject documentation in many countries. Sometimes efforts of unified view of nature (Science) or using knowledge in everyday life are supporting ideas of these trends. On the other hand the previous effort could be associated with the economic basis and is based on the reduction of teaching hours within ministry savings programs. Czech education is traditionally and successfully dedicated to integrating scientific knowledge (including the human part of the geographical curriculum and history) at the first stage of elementary schools especially in subjects as prvouka (first science), přírodověda (science) and vlastivěda (my country). It should be noted that these subjects belong with their content and probably also the concept and methods of work among the most popular subjects. With the end of the first stage of education a synthetic view of nature and society is abandoned. Emphasis is given on deeper analytical knowledge of individual subjects. Analytical systematized knowledge and associated skills are the backbone of the whole education beginning on the second stage of elementary school and ending with post-graduate study. Czech Education weeps over the low popularity and critics of low usefelness of acquired knowledge or skills in everyday life. Parents often face the question of their children sitting over the notebook or textbook and saying "Tell me what is this for?" and try to find right answers. Practical life appreciates rather synthetic skills and knowledge for successful problem solving often in family teams or work teams. The question is how a present practical form of Czech education exactly meets these needs and what universities offer or could offer for education of future teachers.

Within the cooperation of natural science departments of the Faculty of Education of Masaryk University the ESF project "**The development of key competencies of teachers with emphasis on the implementation of curriculum reform using synthesis of science**" (http://www.ped.muni.cz/PRIRODOVEDA) is being solved. Its name suggests that it is for teachers who are interested in applying of scientific knowledge synthesis and skills, both for themselves and subsequently for their students. Partnership is also involved in the project (elementary school Újezd u Brna, grammar school Boskovice and grammar school Křížkovského in Brno). Co-operation of university departments of geography, chemistry, biology and physics and colleagues at elementary and secondary schools represents a tool of intensive teamwork.

GEOGRAPHY IN INTEGRATED SCIENCE

The outside world studies a wide range of natural, human and technical disciplines. Like all disciplines as well as natural sciences stated their object of study. Involved scientific disciplines: chemistry, physics, biology and geography differ in the point of view of outside world study but some properties they have in common. The basic differences lie in a different dimension of study. To be more exact in natural science means more analysis, narrow space for relations, removing study subject from the outside world (it strengthens its research autonomy - laboratory studies with a total removal of the subject from the context of surrounding world is extreme) and tends to miniaturization (Fig. 1). In an effort to interpret it requires the knowledge of those disciplines that do not enter so deeply to these extremes.

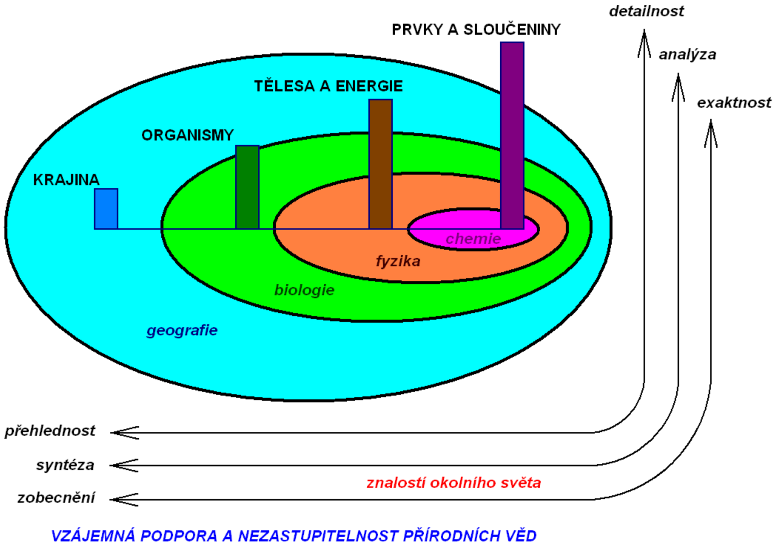


Fig. 1: The outline of differences in reserach practice in selected science branches (author: J. Kolejka)

Integrated science connects key knowledge of sub-disciplines of science during the interpretation of processes in the outside world using "more layers approach". This approach essentially means that the general "interdisciplinary approach" (interpretation of the phenomenon in one branch is based on the interpretation of the same phenomenon in other branch) becomes "inter-scale approach". The same phenomenon has different interpretative dimension according to the chosen scale (Fig. 2). Interpretations of the same phenomenon in different scientific disciplines is based on hierarchical relationships.

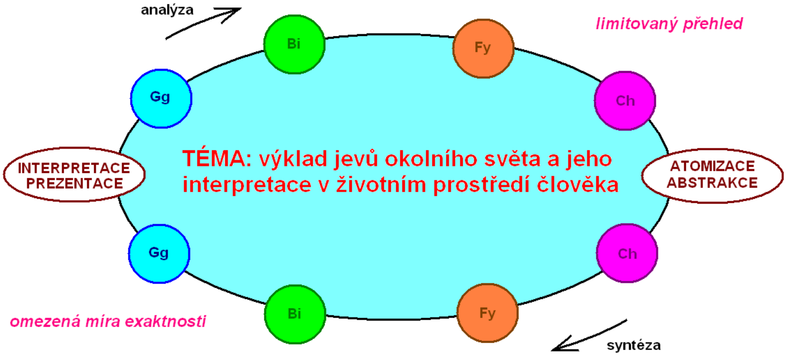


Fig. 2: Diagram of mutual information support of scientific disciplines in their branch research (author: J. Kolejka

Mutual relationship and support of scientific disciplines can be properly demonstrated by problems demonstration whether they come from the environment of geography, biology, chemistry or physics. It offers innovative didactic approach to describing images of the outside world. Involved natural sciences have many research methods and tools to study the world in different scales (from the micro-world of chemistry over the meso-world of physics to the macro-world of biology and mega-world of geography, Fig. 3).

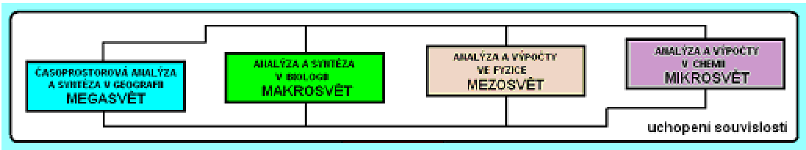


Fig. 3: Dimesionla hierarchy of research activities of scientific disciplines (author: J. Kolejka)

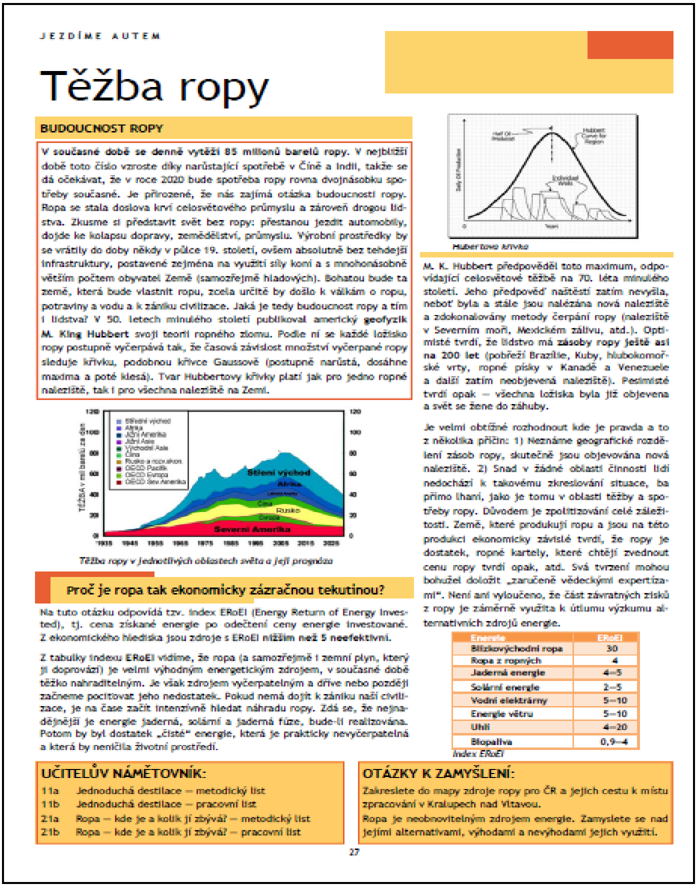
Essentially geography is a synthetic discipline that interprets the properties of the surrounding world in spatial and time contexts based on the knowledge of many other disciplines according to the scale and certain hierarchical system. Interpretation at the highest level of detail is set on a topical level (geographic objects are internally homogeneous and spatially indivisible) while the most general interpretation happens on a global level. Other scientific disciplines do not work with such a large "laboratory" object such as "territory" or territorial unit, but their elements can be studied by their analytic methods. Landscape is the laboratory of geography this laboratory work is the "outside" work. The written language of geographical knowledge is a map and spatially located (later generalized) text.

GEOGRAPHY IN SIX THEMES FROM LIFE AND FOR LIFE

Based on needs analysis of teachers a module of six themes was established (Going by car, Household – world in a small scale, Town and countryside, Clothes make the man, To be Robinson on an empty island and Weather and climate).

Fig. 4: Sample of three front pages of processed topics (author: Mísařová)

Topics are based on a daily reality. Processed text including questions for reflection, sub-tasks, attractions and tables indicating the possible use of chapters in the cross-section theme within curriculum document is completed by set of suggestions - a set of work sheets and methodological sheets thematically related to each chapter.


JEZDÍME AUTEM

Těžba ropy

BUDOUCNOST ROPY

V současné době se denně vytěží 85 milionů barelů ropy. V nejbližší době toto číslo vzroste díky narůstající spotřebě v Číně a Indii, takže se dá očekávat, že v roce 2020 bude spotřeba ropy rovna dvojnásobku spotřeby současné. Je přirozené, že nás zajímá otázka budoucnosti ropy. Ropa se stala doslova krví celosvětového průmyslu a zároveň drogou lidstva. Zkusme si představit svět bez ropy: přestanou jezdit automobily, dojde ke kolapsu dopravy, zemědělství, průmyslu. Výrobní prostředky by se vrátily do doby někdy v půlce 19. století, ovšem absolutně bez tehdejší infrastruktury, postavené zejména na využití síly koní a s mnohonásobně větším počtem obyvatel Země (samozřejmě hladových). Bohatou bude ta země, která bude vlastnit ropu, zcela určitě by došlo k válkám o ropu, potraviny a vodu a k zániku civilizace. Jaká je tedy budoucnost ropy a tím i lidstva? V 50. letech minulého století publikoval americký geofyzik M. King Hubbert svoji teorii ropného zlomu. Podle ní se každé ložisko ropy postupně vyčerpává tak, že časová závislost množství vyčerpané ropy sleduje křivku, podobnou křivce Gaussově (postupně narůstá, dosáhne maxima a poté klesá). Tvar Hubbertovy křivky platí jak pro jedno ropné naleziště, tak i pro všechna naleziště na Zemi.

Těžba ropy v jednotlivých oblastech světa a její prognóza

Huberttova křivka

M. K. Hubbert předpověděl toto maximum, odpovídající celosvětové těžbě na 70. léta minulého století. Jeho předpověď naštěstí zatím nevyšla, neboť byla a stále jsou nalézána nová naleziště a zdokonalovány metody čerpání ropy (naleziště v Severním moři, Mexickém zálivu, atd.). Optimisté tvrdí, že lidstvo má zásoby ropy ještě asi na 200 let (pobřeží Brazílie, Kuby, hlubokomořské vrty, ropné písky v Kanadě a Venezuele a další zatím neobjevená naleziště). Pesimisté tvrdí opak – všechna ložiska byla již objevena a svět se žene do záhuby.

Je velmi obtížné rozhodnout kde je pravda a to z několika příčin: 1) Neznáme geografické rozdělení zásob ropy, skutečně jsou objevována nová naleziště. 2) Snad v žádné oblasti činnosti lidí nedochází k takovému zkreslování situace, ba přímo lhaní, jako je tomu v oblasti těžby a spotřeby ropy. Důvodem je zpolitizování celé záležitosti. Země, které produkují ropu a jsou na této produkci ekonomicky závislé tvrdí, že ropy je dostatek, ropné kartely, které chtějí zvednout cenu ropy tvrdí opak, atd. Svá tvrzení mohou bohužel doložit „zaručeně vědeckými expertizami". Není ani vyloučeno, že část závratných zisků z ropy je záměrně využita k útlumu výzkumu alternativních zdrojů energie.

Proč je ropa tak ekonomicky zázračnou tekutinou?

Na tuto otázku odpovídá tzv. index ERoEI (Energy Return of Energy Invested), tj. cena získané energie po odečtení ceny energie investované. Z ekonomického hlediska jsou zdroje s ERoEI nižším než 5 neefektivní.

Z tabulky indexu ERoEI vidíme, že ropa (a samozřejmě i zemní plyn, který ji doprovází) je velmi výhodným energetickým zdrojem, v současné době těžko nahraditelným. Je však zdrojem vyčerpatelným a dříve nebo později začneme pociťovat jeho nedostatek. Pokud nemá dojít k zániku naší civilizace, je na čase začít intenzivně hledat náhradu ropy. Zdá se, že nejnadějnější je energie jaderná, solární a jaderná fúze, bude-li realizována. Potom by byl dostatek „čisté" energie, která je prakticky nevyčerpatelná a která by neničila životní prostředí.

Energie	ERoEI
Blízkovýchodní ropa	30
Ropa z ropných	4
Jaderná energie	4–5
Solární energie	2–5
Vodní elektrárny	5–10
Energie větru	5–10
Uhlí	4–20
Biopaliva	0,9–4

Index ERoEI

UČITELŮV NÁMĚTOVNÍK:

11a Jednoduchá destilace – metodický list
11b Jednoduchá destilace – pracovní list
21a Ropa – kde je a kolik jí zbývá? – metodický list
21b Ropa – kde je a kolik jí zbývá? – pracovní list

OTÁZKY K ZAMYŠLENÍ:

Zakreslete do mapy zdroje ropy pro ČR a jejich cestu k místu zpracování v Kralupech nad Vltavou.
Ropa je neobnovitelným zdrojem energie. Zamyslete se nad jejími alternativami, výhodami a nevýhodami jejich využití.

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Fig. 5: Sample of one side of the text. At the end of each chapter there are links to files and methodological sheets (separate publication) as well as questions for reflection.

The first theme - "Going by car" is based on our daily reality of using a car as mean of transport. The authors reflect broader context of automobile traffic - its history, the principle of operation, car production and its distribution in the world, the need of fuel and its mining, processing and transportation, related environmental impacts of transport on land and air. The important part of the theme is the active and passive safety. The outline of vision of future automobile traffic closes the publication. The second theme "Home – world in a small scale" sees the household as a functional environmental unit. Attention is devoted not only to people who form it, but also to material, energy and information flows entering the system and without which the household could not exist.

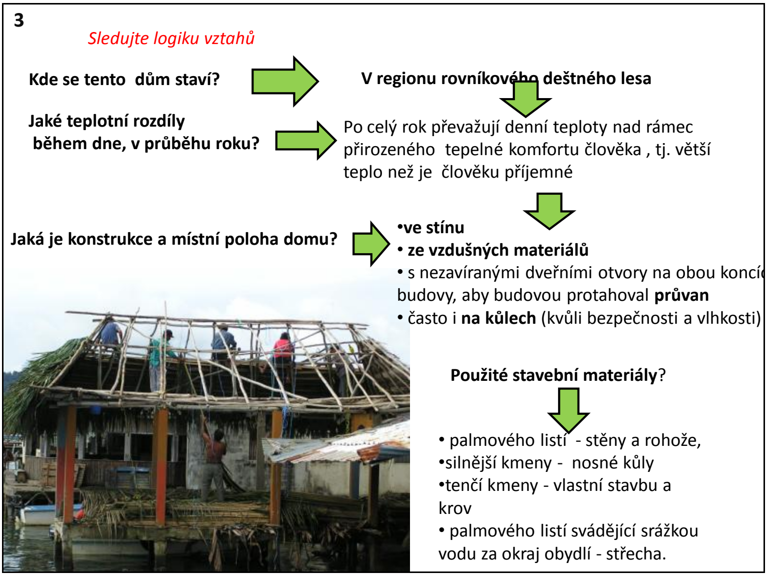

Fig. 6: Sample of photograph analysis and relations analysis within the theme – Household – small world

CONCLUSION

Project researchers use their experiences from integrated education of future teachers and prepare specific materials for teachers from practice including required courses. Correct base of knowledge synthesis given on the first stage in Czech schools could have a necessary continuity in the near future .The success of efforts synthesizing knowledge will be the success of school reform. Pupils and perhaps their parents recognize its practical impact when their children explain why the car actually goes.

*The paper was supported by the project "**The development of key competencies of teachers with emphasis on the implementation of curriculum reform using synthesis of science**".*

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Témata integrované přírodovědy pro učitele zeměpisu

Geografický výklad se při nejvyšší míře podrobnosti odehrává na topické úrovni (geografické objekty jsou vnitřně homogenní a dále prostorově nedělitelné), naopak nejobecnější výklad se děje na globální úrovni při zohlednění všestranné a mimořádné heterogenity objektů z prostorového (objekty-území se skládají z hierarchicky nižších a homogennějších teritoriálních jednotek) i časového hlediska (tytéž procesy v analogických územích neprobíhají synchronně). Regionální a krajinná úroveň jsou dalšími mezistupni výkladu jevů v životním prostředí. Zainteresované přírodovědné obory objektivně disponují výzkumnými metodami a nástroji poznávání světa rozdílné rozlišovací úrovně (od mikrosvěta chemie, přes mezosvět fyziky po makrosvět biologie a megasvět zeměpisu), jejich optimální propojení při vzdělávání vynikne pochopením celostnosti okolního světa v jeho mnohoměřítkové rozmanitosti na běžných objektech a jevech životního prostředí člověka.

E-LEARNING COURSEWARE PORTAL FOR CLIMATE AND ITS CHANGES

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Abstract: *Climate change is the hot issue discussed on different levels and affecting everyday life even in political and economic decisions that touch everyone.*

To bring relevant scientific information understandable by the greatest group of people is necessary. In particular, to provide information of climate change to young generation, students and pupils, is very important. One way is e-learning – a modern form of distance learning. E-learning makes it possible to adapt education to individuals' needs, including disabled learners. Technology in support of learning enables remote communication and cooperation, removal of communication barriers, reduction of stress load. This leads to improved quality of the pupils' and students' learning approach.

Current need of modern and efficient presentation of information focused on climate change is realized through the E-klima project. The research aim is to create e-learning courses with a thematic focus on the climate and its change consisting of up-to-date and accurate information from the field of climate change and environment.

The main objective of the courses is to provide educational materials to various groups of users (from primary schools to departmental staff offices), focusing on natural and social sciences related to the climate, climate change and other Earth sciences. E-learning courses are designed with usage of new trends; it's not just simple study text. There are multimedia elements such as images, animations and videos. Text can be also heard in audio form. The attraction of the course illustrates the motivation and activation features such as games, quizzes or team challenges. Verification of knowledge is realized by usage of different types of test questions. An integral part of courses is the feedback. These e-learning courses are a modern educational tool; its great contribution is well-arranged form of information on one place.

Key words: *Climate, E-learning, E-klima, Education model*

INTRODUCTION

The research project called "Education model of e-learning for lifelong learning in selected branches of environment" is realized by Palacký University in Olomouc (Czech Republic). The main task of the project was a realization of e-learning courses focused on topics of climate and its change. Courses include high quality and accurate information on climate protection and the environment. The courses provide educational materials for different user groups. Content is focused on science and also social-science subjects related to climate, climate change and other earth sciences. The project is carried out in cooperation of three institutions:

- Palacký University Olomouc (UP) – Project Coordinator, provides the content of courses and teaching learning model, including the accuracy of e-learning courses
- Czech Hydrometeorological Institute (CHMI) – supplier of the data and information for the content of courses, supervisor of the natural-science aspects in the content of courses (physical and geographical aspects)
- University of Economics, Prague – supervisor of the social sciences in the content of courses (economic, legal and political aspects)

Target user groups for that are focused the educational model and the content of e-learning courses are defined as follows:

- School group (three subgroups: primary, secondary and high schools)
- Departmental staff group (two subgroups: professionals working in environment resort and employees of the state and local governments without training in the field working in the environment resort, including employees of public administration and research and advisory institutions)
- Public groups (general public with an interest to get more information in the field of climate and its change, including business and nonprofit organizations).

Fig. 1: Project logo

The project consists of several phases:

1. Creation of methodology to compile the education model.

2. Selection of a suitable LMS (Learning Management System) for the e-learning courses.
3. Compilation of the contents and fulfilment of the e-learning courses.
4. Implementation and Users' Testing.
5. Evaluation and full operation of e-learning.

EDUCATION MODEL

Compilation of education model was done in several steps. At the beginning, as a result of discussion about these documents, especially by the project investigators who already have personal experience with e-learning, core concepts were unified and defined (e.g. teaching model, module, chapter, target group, etc.) and theoretical underlying materials in the form of text documents were processed for them. Then was compiled structure of courses. The number of modules in courses, type of building blocks and way of their use were defined. All this was based on theoretical knowledge and experience from the preparation of similar courses in the past.

LEARNING MANAGEMENT SYSTEM (LMS)

Learning Management System (LMS) is the control educational system, application applications addressing the administration and organization of teaching in e-learning [2].

LMS is an application that integrates the various rule of online tools for communication and management studies (forum, chat, books, records, boards etc.). Also made available to users of teaching materials and educational content online or off-line [4]. Normal functions of education can be directed various tools implemented as individual modules, such as accounting and management courses, curriculum management, student assessment records, testing and checking of users, communication tools, repository of learning content, etc. For all these function is an important requirement for their portability and standardization. LMS should be able to open, for example, quickly and easily integrate educational content, created before its introduction. After testing, several LMS was selected as the best system LMS Moodle.

Moodle makes it possible to divide the course into sections that can either represent temporal or thematic sections. It disposes of two categories of tools – Information sources that are designated for the presentation of additional study materials and information sources from the Internet or other files, and Activities that are designated for the presentation of the subject matter.

CONTENTS OF THE E-LEARNING COURSES

Simultaneously with the creation of the methodology and structure the content of courses, modules with concrete topics and chapters/sub-chapters was defined. This part of the creation of the courses was made by expert supervisors for each topic. First, e-learning course for the university target group was compiled; it was then used as a basis to infer the courses for other target (sub)groups. Courses, modules and chapters were filled with concrete subject matter in a selected learning environment. At the same time, didactic scenarios were elaborated to the level of individual elements. The basic university e-learning course of the E-klima project contained six basic modules:

- Climate system
- Climate variability and change
- Impact of climate change
- Problem causes, driving force
- Policy and tools

EVALUATION

After filling of the courses content there was realized the testing of e-learning courses. First of all it was needed to select testing target groups. There had been defined some criteria that established rules for selection of an appropriate entity that can participate in testing. The main advantage was that the test could be used for university students at the Palacky University and the University of Economics as well as for departmental staff of CHMI institute. After that there were contacted individual representatives of selected testing groups. Before testing there were chosen teachers responsible for carrying out tests. There are familiar with the educational system and with requirements for testing.

Testing was conducted on small numbers of users and the main task was to get the first feedback on the e-learning courses of E-klima project. Also it was important to test used technologies, such as server stability, response time, access speeds, etc. Testing was carried out after the determination of the timeframe (for example university students in one semester-long course). Each course was led by a tutor who was responsible for testing. This tutor introduced the course to users, provided support and evaluated the feedback at the end of the course. At the beginning of each course, users were acquainted with the basic elements of the testing, such as access to the course, creation of a user account, description of the learning environment of the course, basic control and navigation, system capabilities, technical requirements to run the course, etc. Also there were acquainted with the time requirements and disposition of the course. During the course, users have tested the various features offered by the scheme; in case of any questions they had to communicate with the tutor. The technical support was provided by the administrator of the course.

CONCLUSION

During the project it was needed to analyze the teaching methods in the country and abroad as well as it was needed to make an assessment of used methods. Next, there was compiled a teaching model. It was set the basic structure of the teaching course, content of lessons and thematic curriculum.

The analysis and study of corresponding literature on e-learning led to a definition of the current trends and basis for the creation of new e-learning courses for the E-klima project. During their creation we adopted the blended learning approach. This approach consists in e-learning chapters and ongoing face-to-face meetings. We put emphasis on interaction (especially in the case of courses for younger users), feedback needed for the quality assessment of the course, and multimedia aspect of e-learning (video, images, animations, sounds). From the users' point of view e-learning courses must lead to the development of key competences (soft skills), including teamwork and teambuilding [1]. These course characteristics are developed through discussion forums or surveys. We also included the principles of competition (quizzes, crosswords, competitions) and cooperation (fictitious projects). Sharing of information was enabled through notice boards or discussions. In some tested courses modern elements were implemented, especially edutainment, games, playing roles and activity, i.e. elements that require online communication to complete the tasks and activities [5]. All elements of high-quality contribute to the attractiveness of e-learning courses and to the improvement of the process of information transfer towards the target group or a particular user.

This part of work was followed by selection and configuration of the LMS (Learning Management System). Then it was needed to fill the content of all courses. This was compiled by experts and converted into the LMS environment. Subsequently, there was a pilot testing of courses and after that all mistakes and shortcomings have been removed. Next testing with all user groups is still in process. Overall, we are testing about 15 different groups on the total number of around 350 people. In subsequent phases courses will be optimized and the odds will be finally corrected. Then outcomes will be distributed to the appropriate authority of the project.

Courses are created with modern and innovative teaching device. They are very visual and can engage and motivate the user through multimedia features. An interesting added feature is the insertion of a spatial task with the theme of the learning environment. This was done because of the need to emphasize a spatial content. To understand the broader context must not be overlooked aspect of space. Emphasis was also placed on simplicity and user-friendliness learning environment. All these positive features make course user-friendly for teachers and pupils and help to improve the relationship with e-learning in general.

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E-learningový výukový portál pro otázky klimatu a jeho změn

V současné době jsou témata z oblasti klimatu velmi aktuální. Pojmy jako globální oteplování, znečištění ovzduší nebo klimatická změna jsou zmiňovány čím dál častěji. Velmi důležité je objasnění těchto i dalších problémů široké veřejnosti, zejména pak žákům a studentům různých vzdělávacích zařízení za využití moderních přístupů. Vytvořením e-learningových kurzů na téma klimatu a jeho změny se zabývá projekt eklima. V rámci projektu byl vytvořen výukový model e-learningových kurzů celoživotního vzdělávání ve vybraných oblastech životního prostředí se zaměřením na klima a jeho změnu. Garanti z oblasti vysokých škol společně s odborníky na klimatologii zajišťují kvalitu a množství informací z oblasti ochrany životního prostředí v jednotlivých lekcích. Obsah e-learningových kurzů je zaměřen na tematické okruhy zahrnující fyzikální podstatu klimatu, přírodovědné aspekty klimatu, ochranu přírody, krajiny a ovzduší, ekonomiku, legislativu a politiku ochrany klimatu, příčiny a důsledky změn klimatu, apod. Jednotlivé lekce přitom neposkytují pouze strohé informace, ale jsou zde uvedeny i náměty k zamyšlení nebo návody k racionálnímu využívání přírodních a obnovitelných zdrojů energie. Počítačem podporovaná výuka formou e-learningu hraje v celoživotním vzdělávání významnou roli, protože kromě tematicky zaměřeného obsahu kurzů se uživatel seznamuje i s počítačovým prostředím a s možnostmi internetu. Samotný kurz obsahuje kromě textových, grafických a multimediálních prvků i diskusní fóra, nápovědu, ale také odkazy na další internetové stránky a možné zdroje informací.