

Spatial pattern of suburbanization in the Czech Republic *Tomáš Chuman & Dušan Romportl*

Abstrakt:

Suburbanizace je jedním z nejvýznamnějších procesů měnících současnou krajinu. Tento proces postupného „přelévání“ města do krajiny, lze postihnout několika způsoby. Cílem příspěvku je uvedení možné metody stanovení prostorového rozmístění procesu suburbanizace v rámci státního území a stručné představení výsledků analýzy změnové databáze. Popsány jsou jednotlivé lokality, kde proběhly nejvýznamnější změny v rozsahu rezidenční i komerční zástavby během první vlny suburbanizace v 90. letech.

Key words:

suburbanization, urban sprawl, CORINE Land Cover

Introduction:

Suburbanization fundamentally influences the natural environment both at the landscape and species level, energy and material flows. In the report published by the European Environment Agency (EEA, 2006) suburbanization is mentioned as a key process currently in progress in the countries of the EU which has number of negative impacts on the landscape. In the landscape as a part of natural and cultural heritage, whose protection is embodied in national legislation and international legal documents, there are crucial changes due to the process of suburbanization, and number of irreplaceable landscape functions (food production, biotopes existence, recreational and retentive functions, etc.) is therefore potentially endangered.

There are several ways to evaluate suburbanization, the process of a gradual overflow of the city into the landscape. There is a possibility to use statistical data on migration, housing construction, etc. produced by the Czech Statistical Office that indicates which administrative units record the highest increase in statistical indexes. But by the statistical indexes we encounter the problem of statistical units, for which the data are aggregately processed. If we use one of the administrative units, district or municipality, as a reference unit, the increase of spatial extent of urban areas may be distorted as this increase is irregular within the unit area. Except for the insufficient spatial localization, we are not able to render the so-called commercial suburbanization (construction of industrial parks, car parks, petrol stations, logistic centres, etc.) by means of statistical data. Data of remote sensing represents a suitable basis for monitoring landscape changes, which clearly shows an area range and localization of process. Because of high costs and time consumption in processing, it may be used the classified database CORINE Land Cover (further shortened to CLC) (EEA 1990, 2000) for spatial extent of suburbanization mapping while being aware of restrictions caused by scale and size of the minimum mapped unit.

The CLC database has a sufficiently detailed legend which distinguishes several types of urban areas (urban built-up areas; industrial, commercial and transport zones; mines, fillings and building sites; artificial non-farm lands and recreation areas), meaning categories which render a residential as well as a commercial suburbanization. It is therefore possible to render the so-called first wave of suburbanization in the Czech Republic by analysing the changes in CLC database from the year 2000 compared to 1990. To render the second wave of suburbanization which took place after 2002 (Ouředníček, Posová 2006), it will be necessary to wait for the release of an updated database CLC 2006.

With respect to the above mentioned facts, it is possible to state analyses of changes in urban areas included in the CLC database by several methods:

1. increase in urban area expressed in administrative units (Bičák & Kupková, 2006; Hasse & Lathrop, 2003)
2. increase in urban area expressed in reference to a regular net (Poudevigne, 1997)
3. assessment of a change in urban areas by means of suitable indicators in certain spatial units (kol. 2006)

Information on localization and a process range is crucial to an impact assessment; in addition, it provides us with information where this transformation happens.

Methodology:

The aim of this paper was to map a spatial pattern of the first wave of suburbanization in the Czech Republic. For comparison, the approach assessing a change in terms of administrative units as well as the approach of assessing a change in a regular net was used. Data on categories of urban areas were exported from the CORINE Land Cover database from the years 1990 and 2000 and these categories were consequently configured into the categories rendering commercial and residential sub/urbanization. In the first category the continuous and discontinuous urban house-building was involved (codes 111,112 of the CLC nomenclature); and the second category contains industrial or commercial zones, public road and railway systems with neighbouring areas, airports, sport and recreational facilities (codes 121,122,124,142 of the CLC nomenclature). As a reference base of municipal boundaries the layer from ARC ČR 500 was used and a net mesh-sized 1km² was created for assessment in a regular net. Areas of two tracked categories were calculated for single municipalities and meshes and these were expressed relatively in reference to a unit area in per cent. The data were analysed and the results visualised by the help of ArcGIS 9.2 tools.

Results and discussion:

The data analysis from CORINE Land Cover dated from the years 1990 and 2000 showed an increase in commercial and residential areas in a similar amount. The area expanse reflecting the residential suburbanization increased in 2000 by 50 km² compared to 1990. The area expanse reflecting the commercial suburbanization increased by 42 km².

Fig. 1: Map of increase in residential sub/urban areas between 1990 and 2000

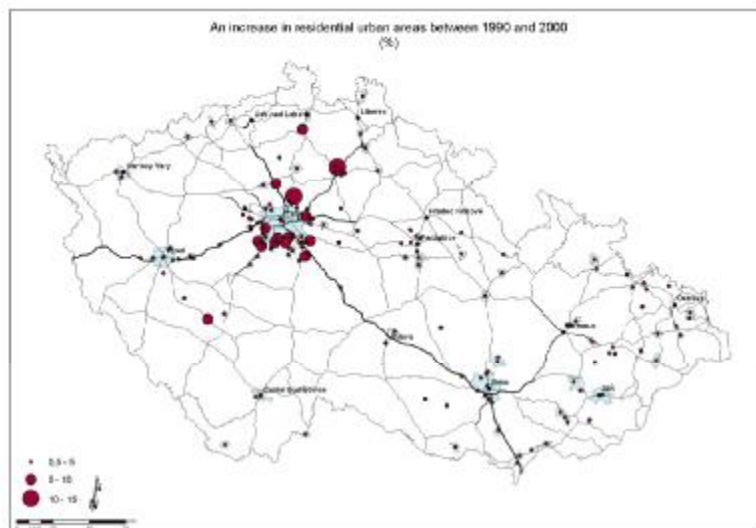
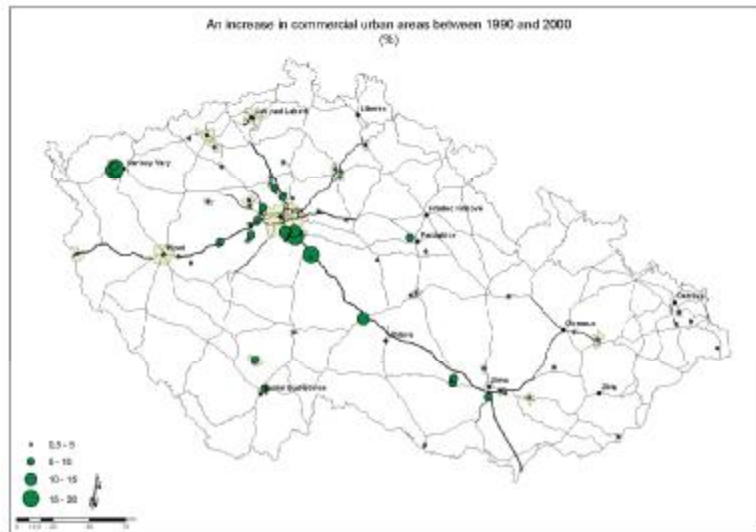


Fig. 2: Map of increase in commercial sub/urban areas between 1990 and 2000



We will though find the differences in the spatial distribution of the mentioned territories. While in the event of residential suburbanization the highest increase was logically noticed near the big cities, in case of commercial suburbanization the logistically favourable location of new constructed premises became a significant factor. In both cases the most significant increase in suburban areas was noticed in the rear of Prague where this process was also the most frequently examined and described. The first wave of residential suburbanization became also evident together with the outskirts of Prague in its southern surroundings with attractive landscape; the synonyms of this development were the municipalities of Jesenice, Průhonice or Dobřejovice. Significant changes in construction area were also noticed p.e. in the land registrars in Hostivice, Rudná, Řitka, Líbeznice, Šestajovice and in a number of others all over the Prague territory. Such significant changes – an increase in residential areas over 15% - have not happened in the rear of any other big cities. But the process of sub/urbanization have not been naturally avoided on the outskirts and surroundings of Brno, Ostrava, Plzeň and České Budějovice, nevertheless it did not achieve such a dimension as in the area of Prague. A high increase in the residential built-up area in the surrounding of Mladá Boleslav can be explained by a fast development of this economic centre, but the suburb development in the rear of Česká Lípa or a relatively high concentration of new built-up areas in Pardubice, Chrudim and surrounding municipalities is quite surprising. In both cases it is more a matter of a spread of current sites than a classical suburb formation outside the municipality. If we assess the qualitative changes in the landscape use the new built-up area mostly grew on the agricultural land, notably on the arable land and permanent grassland, and less on other anthropogenic areas.

The most significant development of the commercial suburbanization was also noticed in the rear of Prague with obvious ties to important roads. The highest increase in commercial areas and entertainment centres or logistical warehouses occurred in the immediate surroundings of the D1 highway, firstly in the municipalities of Čestlice, Modletice and Průhonice. The commercial build-up in the land registrars in Hostivice, Kněžves, Rudná, Nučice and Loděnice along the D5 highway; or more precisely in the municipalities of Klíčany and Panenské Břežany near the D8 highway and in the municipality of Dochov near the D11 achieved nearly the same dimensions. In the rear of Brno the process of suburbanization achieved the highest dimensions in the municipality of Modřice with an extraordinarily advantageous logistical position and further in Šlapanice and Jiříkovice. In case of other bigger cities a more remarkable increase in commercial zones was recorded

round Mladá Boleslav, Ústí nad Labem, Plzeň, České Budějovice and Pardubice, and less in the broader surrounding of Olomouc a Ostrava.

A suitable transit position plays a key role just by the construction of some commercial areas, especially logistical centres. An increase in so exploited areas in the municipality of Vystrkov u Humpolce at the intersection of the D1 highway and the road number 34 is a good example. A similar placement of mentioned warehouses and centres arose along significant roads even in bigger distances from major sites, p.e. in Vranov and Hvězdnice near D1 or in Žebrák near D5. The reasons for enormous growths of commercial build-up cannot be clearly assessed without a detailed examination in Újezd u Rosic and Rapotice not far from Brno or in the cadastral units of Hory, Jenišov and Nové Sedlo near Karlovy Vary. These changes as well as a number of others dispersed all over the Czech Republic cannot be assessed as a part of suburbanization processes with regard to the absence of a relation to the residential centre.

Some results of the spatial suburbanization placement analysis are necessary to be judged critically. By the classification of the suburban scenes for the CORINE LC database p.e. a merger of existing garden and orchard areas with a new continuous built-up area could have occurred and the final change therefore presents an enormous growth of areas. A counter misguided result can be a merger of the existing residential build-up with newly constructed commercial areas in the 121 class of Industrial and commercial zones which results in a total fall in areas of the continuous municipal build-up.

It is therefore necessary to assess the mentioned methodical procedure and achieved results with respect to predicative ability and accuracy of processed data. Nevertheless it is an assessment of the suburbanization spatial extent on a national scale which is easily accessible as for data and methodically quickly manageable.

Conclusion:

Suburbanization definitely belongs to the most significant landscape processes at present as well to the most severe problems of the current landscape planning. Its development does not only lead to changes in the natural components of landscape, energy and material flows but the modification of the method of landscape use and physiognomy changes also its cultural aspect and implicitly spiritual and aesthetical values. We suppose that this issue has been despite its relevance so far neglected by landscape-ecological experts, although loads of information on the impacts of this process on the landscape in the widest sense exists abroad.

The aim of the mentioned paper was to introduce possible methods of spatial distribution assessment of the suburbanization process in terms of the state territory and the results of alteration database analysis. On the basis of the mentioned outputs the territories concerned will be defined, where within the project continuation the suburbanization impacts on the landscape on a local scale will be tackled.

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