Evaluation of sustainability with focus on the current urban trends and problems in concrete Slovak cities

Prepared by Zuzana Hudekova, Regional environmental Center Slovakia

Introduction

A city is a complex system greatly dependent on outer resources. Inputs are brought in (e.g., raw materials, energy and food) which are then transformed into outputs into the environment (e.g., emissions into the air and water, wastes). When we consider the sustainability of city systems, we shall to focus on the interrelationship between a city, its environment and the environment of the surrounding land. The perception of city development in close connection with global human problems brings new challenge inherent in these all relationships as well.

It was the relationship between environmental quality and human population health which first led to concerns about negative tendencies in this area in the past. Taking into consideration that the majority of European citizens live in cities, it is necessary to consider the urban environmental quality. According to the latest estimates by the scientific community, global warming and related climatic changes are developing more rapidly than expected. Vegetation in urban areas is becoming an unavoidable necessity; however, its protection and creation is on the margins of land planning activities. Moreover, it suffers from the short-term interests of economic development (e.g., industrial parks development).

The urban atmosphere suffers not only from environmental problems, but from socio-economic ones as well, such as lack of job opportunities, unemployment and the resulting poverty of a certain portion of the citizenry; limited societal services and amenities related to areas such as accommodation, education, and cultural activities and events; problematic disparities in the socio-economic structure of the populace leading to socio-pathological phenomena. These problems, too, need to be solved – preferably in parallel with the above-mentioned environmental issues.

What remedies are there to prevent cities for degrading? Is it possible to stop or reverse the trend of sub urbanization and urban sprawl and other un-sustainable trends?

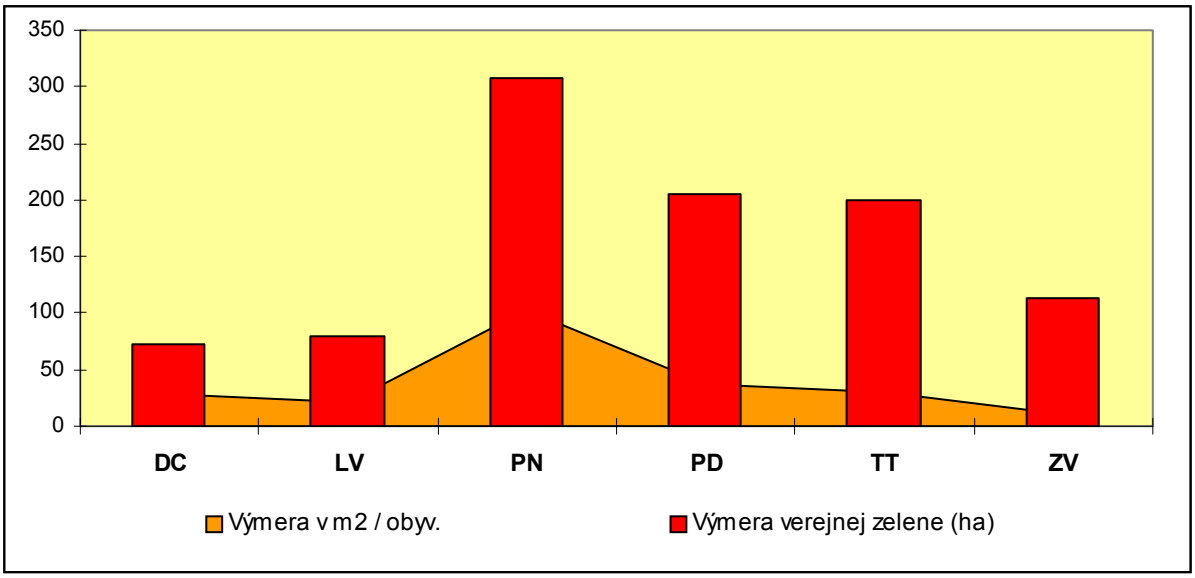
First of all we propose to evaluate the current trends and situation through the set of indicators related the above-mentioned topics (land uses planning, sustainable transport promotion, improving quality of built environment, assure access to public services and open green spaces, planning and participation of inhabitants etc). In the following paragraphs we are providing information about the results of 6 Slovak cities (Piešťany,Trnava, Prievidza, Levice, Dubnica nad Váhom and Zvolen) evaluation through the indicators of urban sustainability from the topics as *sustainable urban planning* and *construction and spatial development* that has been realized during the last year 2005. The evaluation was implemented under the project "**Sustainable Development of Cities and Mitigation of Impacts of Climate Change on Quality of Life and on Environment in Urban Areas**" with the financial support of the European Commission under the LIFE III Environment, as well as with the support of the Ministry of Environment of the Slovak Republic.

1 – Proportion of public green areas in the city

Public green areas are an absolute necessity with regard to the sustainable development of cities from the environmental point of view and they fulfill multiple functions. However, in order to achieve those functions, not only the quantity but also the quality of the individual areas is of utmost importance. The city should be interested in achieving a certain proportion of public green areas per citizen and in increasing the quality of existing areas so that these functions can be realistically met Data obtained on the model cities are shown in Tab. 1 and Graph 1.

Tab. 1 and Graph 1 – Representation of public green areas in cities (PN-Piešťany, TT-Trnava, PD-Prievidza, LV-Levice, DV-Dubnica nad Váhom, ZV-Zvolen).

	DC	LV	PN	PD	TT	ZV	Average
Surface of public green areas (ha)	73,2	80,0	307,3	204,7	200,0	114,0	**163,2**
% of built-up area	1,4	9,3	7,5	20,0	11,7	4,0	**9,0**
Surface in m^2 / citizen.	27,9	21,6	102,5	37,8	29,4	10,0	**38,2**



Surface in m^2 per citizen
Surface of public green areas (hectares)

2 – Accessibility to public green areas by citizens

Park areas and public surfaces with corresponding facilities comprise the core of a city area green system and they have a particular role regarding the relaxation and short-term recreation of citizens. Thus, during the urban planning process, the assessment of such areas should be carefully performed, and where there is an insufficiency they should be suggested for completion – new surfaces should be developed in order to reach the goal of 100 % accessibility for all citizens. Real use of park areas by citizens could serve as an additional parameter (% of citizens frequently accessing park areas). Data obtained originated from the model 6 cities and their comparison with the data obtained though the **evaluation in year 2003 marked with green color** PU-Puchov, RS-Rimavská Sobota, SA-Sala and EU-model European cities) are shown in Tab. 2.

Tab. 2– Selected data on surface and accessibility of public green areas

	DC	LV	PN	PD	TT	ZV	Avg.	PU	RS	SA	EU
Number of areas larger than 0,5 ha	3	14	9	18	9	39	**15,3**				
Surface (ha)	9,2	38,1	85,0	102,7	46,7	114,0	**65,9**				
Accessibility by citizens (% with access up to 10 min.)	61,1	100,0	80,1	82,6	85,5	61,9	**78,5**	62,3	54,0	71,9	69,0
Use of park areas - often (% of citizens)	26,0	28,1	33,0	26,2	20,6	27,2	**26,9**				

3 – Accessibility of selected public services by citizens

This indicator evaluates the accessibility of selected public services in the city by its citizens – public health and social services, public transportation system stops, elementary schools, food markets, separated waste disposal facilities of selected types of waste Data obtained from the model cities and their comparison with the results in 2003 are shown in Tab. 3

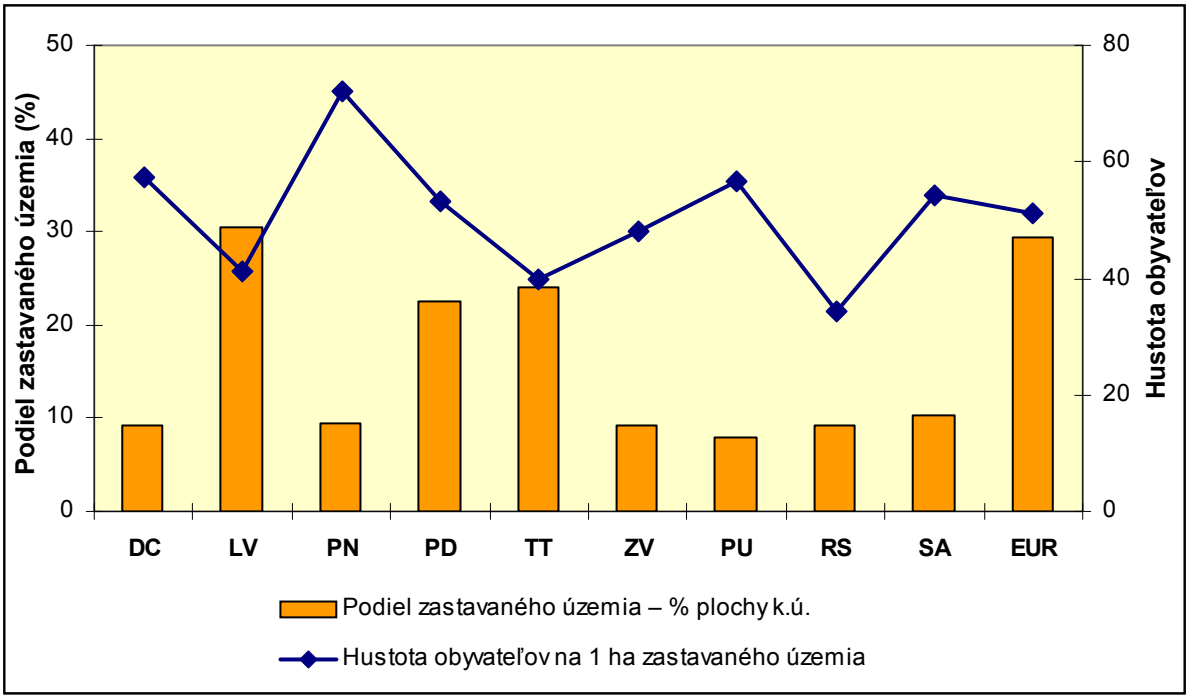
Tab. 3– Accessibility of selected public services by citizens (minutes of walking)

Average accessibility in min.	DC	LV	PN	PD	TT	ZV	Avg.	PU	RS	SA
Public park, forest park, bigger public playground with park or other publicly available recreation area larger than 0,5 ha	13,0	15,0	22,0	20,9	19,0	14,7	**17,4**	14,0	17,0	12,0
Health services (ambulance, district physician)	12,0	25,5	21,0	25,0	19,0	23,0	**20,9**	15,0	23,0	15,0
Public transportation stop for traveling into city center	7,0	5,7	7,0	5,8	5,5	5,8	**6,1**	7,0	7,0	8,0
Closest elementary school	7,0	8,9	10,0	10,8	7,1	11,8	**9,3**	9,0	11,0	8,0
Closest food market (including bakery, fruit and vegetables)	6,0	6,4	8,0	6,2	6,1	8,0	**6,8**	7,0	6,0	6,0
Closest restaurant with warm dishes	9,0	16,8	11,0	11,9	11,5	14,0	**12,4**	12	17	9
Facility for separated waste collection, or collection yard (paper, glass, plastics)	8,0	10,2	8,0	11,4	13,7	10,0	**10,2**	6,0	11,0	13,0
Average accessibility of above services (min.)	**8,9**	**12,6**	**12,4**	**13,1**	**11,7**	**12,5**	**11,9**	**10,0**	**13,1**	**10,1**

4 – City urban planning

This indicator assesses selected urban planning parameters – inhabitant density (per 1 hectare of cadastral area and built-up area), proportion of built-up areas (% of cadastral area), proportion of no fertile areas in the city cadastre (% of surface). This approach is based on the fact that urban planning is also expressed as an increased extent of built-up areas in conjunction with an increase in the number of inhabitants in the administrative city territory. We consider it important to avoid an additional increase in inhabitant density per unit of a built-up area; on the other hand, the total proportion of built-up areas in the framework of a cadastral territory should not be dramatically increased; moreover, it is feasible to decrease the surface of no fertile and abandoned areas. Data obtained from the model cities and their comparison with the results in the year 2003 are shown in Graph 2.

Graph 2 – Selected parameters of territory urbanization



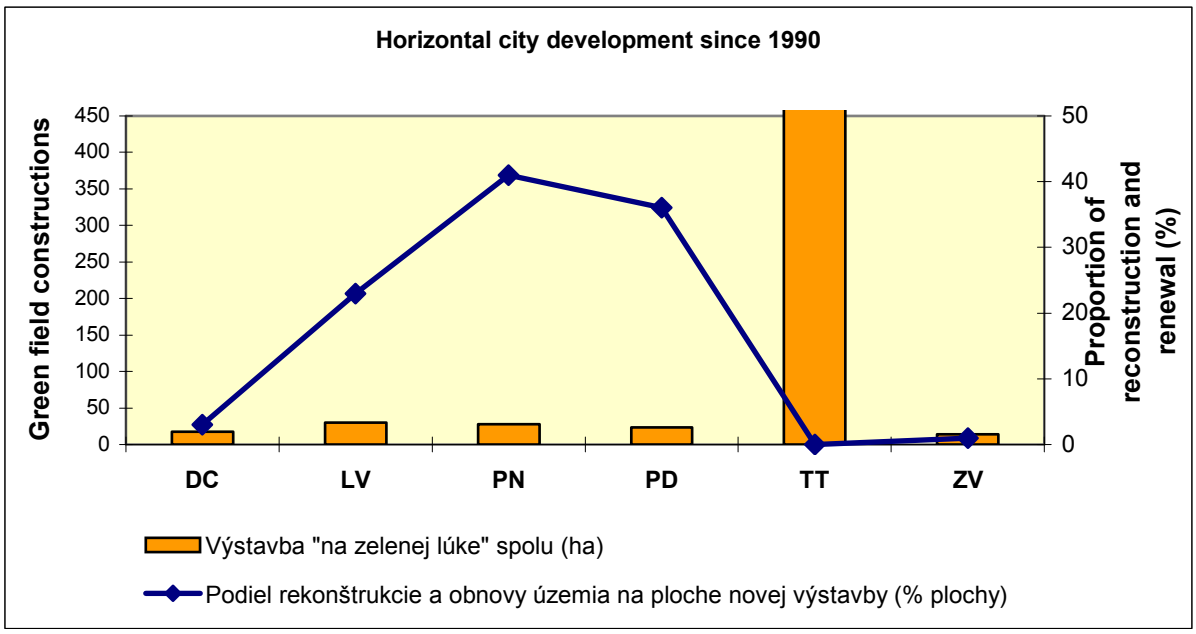
Translation:

Proportion of built-up area (%)
Population density
(Legend) Proportion of built-up area - % of surface of cadastral area
Population density per 1 hectare of built-up area

5 – Spatial development of a city

The indicator evaluates selected parameters that characterize the prevailing construction type within the territory of individual cities – size of development areas for construction (per category – residential, services, industrial, production or technical facilities), as well as a comparison of the occupation of new areas with pool reconstruction areas. The indicator is linked mainly to the issues of territory urban planning – the high involvement of new areas for production and technical facilities and roads is a typical event of past periods in Slovakia (so-called construction in green fields) on one side and, in contrast, a substantially lower emphasis is given to the reconstruction and renewal of outdated, abandoned or deteriorated building pools and no fertile areas (so-called brownfields). This process is clearly unfavorable from the sustainable development point of view; therefore it is necessary to stop it or at least to reduce it. Data obtained from the model cities are shown in Graph 3.

Graph 3 – Parameters of spatial development of cities since 1990 (hectares)



Legend (translation): Construction in “green field”, total (hectares)
Proportion of reconstruction and renewal

6 – Development of landscape structure

This indicator evaluates the changes in land use within a city cadastre territory – the presence of individual land use categories with emphasis to the proportion of forests and permanent vegetation, proportion of agricultural soil, as well as the ratio of built-up and no fertile areas. Time development and mutual comparison of areas is also an important parameter.
The land structure of a city territory (not only built-up areas, but also a city’s background – cadastral area) forms one of the important sustainable development factors – the survival of a certain proportion of positive landscape elements is important (forest, grassland, surface water areas); however, the reality is very often different (an increase in built-up areas). Preservation of sufficient agricultural soil surface is also necessary from the long-term perspective. Data comparison and time trends are therefore highly necessary.

Data obtained from the model cities and their comparison with results from the year 2003 are shown in Tab. 4.

Tab. 4 – Proportion of main landscape structural elements in city cadastres - %, year 2004

	DC	LV	PN	PD	TT	ZV	RS	SA
Agricultural soil	17,3	52,1	54,7	24,0	72,0	8,6	38,3	72,4
Meadows and pastures	5,7	0,8	2,3	12,6	0,1	22,5	18,2	0,6
Gardens	1,3	5,7	2,5	3,3	2,4	2,1	2,3	2,4
Fruit trees, vineyards and hops cultures	0,0	6,0	1,1	0,0	0,3	0,1	0,0	2,2
Forests	53,8	0,4	0,1	35,8	0,0	52,1	28,4	3,5
Water surfaces	2,5	5,0	10,7	1,1	1,1	2,0	1,3	4,0
Other and no fertile areas	8,0	9,4	11,4	7,6	3,0	3,4	2,1	4,7
Built up areas	11,4	20,6	17,3	15,6	21,1	9,2	9,3	10,2
Total	**100,0**	**100,0**	**100,0**	**100,0**	**100,0**	**100,0**	**100,0**	**100,0**
Cadastre area (hectares)	**4913,6**	**2908,2**	**4420,0**	**4306,2**	**7153,5**	**9874,0**	**7755,1**	**4496,7**

Conclusions and recommendation

The evaluation of cities by indicators without particular targets set up only assesses the present status and repeated evaluations show the trends. The **target identification offers correct signal to local government strategie**s and it allows monitoring and comparison the situation with strictly settled values of individual parameters. More and more self-governments throughout Europe accepted or plan to accept the approach to sustainable development that could be based on **identification of concrete targets**.

It these terms it is important to distinguish between short-term and strategical objectives. Short-term objectives should define as measurable and tangible results. Short-term objectives can be separated into two categories:

- *obligatory short-term objectives required by law: these objectives have legal background. They can be defined in certain European directive e.g. limit air pollution values or in national law or binding order of local government;*
- *voluntary short-term objectives (optional): they result e.g. from voluntary but politically relevant processes as is Local Agenda 21, Aalborg commitment, etc.*

Short-term objectives should be accessible and realistic. It should not be „too high“ nor „too low“. The vision of future must be ambitious, but the stakeholders (what pays also in environmental issues) require particular and pragmatic results. Short-term objectives are globally the compromise between the vision and the realism.

Local Authorities in Slovakia have a possibilities to incorporate the results of the analyses resulting from the evaluation through urban sustainability indicators in the strategic development plans and program (so called Program of Economic and Social Development) and through the process of master planning.

Contact: Zuzana Hudekova, REC Slovakia, Vysoká 18, 811 06 Bratislava, e-mail: rec@changenet.sk, www.rec.sk, www.udrzatelnemesta.sk