

# Quality and Sustainability of Life Indicators at International, National and Regional Levels

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## Introduction

This presentation gives a brief overview of the methodology and results achieved in the field of creation and evaluation the QSL indicators at three basic spatial levels – global, national and sub-national (regional).

In years 2001-2002 we have developed the system of QSL indicators with use of s. c. methods of descriptive statistics, which are based on common methods of integration and averaging of statistical parameters. Results are expressed as aggregated indexes of QSL in all three above mentioned levels. Of course, these results are influenced by our view on problems of quality and sustainability of life.

This year we are developing a new approach for evaluating this problem area. We are exploring a use of non-parametrical multidimensional statistical methods. These methods could be characterized as an independent tool for evaluating relationships among a variety of indicators and problem areas. On the other hand they could evaluate also variability in a spatial meaning (countries and regions).

Especially results of the first mentioned approach are designed for today's presentation and discussion.

## Basic Methodological Steps

We use comparable procedures in all three levels of research. Basic methodological steps are:

- Creation of QSL model
- Data compilation from information sources
- Data preparation for statistical analyses, data screening
- Statistical Analyses
- Interpretation of Results.

*Creation of model* was the first step for all levels of our interest – it means an expression of quality and sustainability of life indicators system. We have created a hierarchical model which consists of 3 basic levels: individual parameters – partial indexes – overall index. In accordance with sustainable development theory we have used several main aspects of sustainability (social, economic, environmental aspects and their problem areas). This model is modified for each level, but the basic scheme is valid for all levels.

For *data collection* we have used only broadly accessible information sources - databases and publications. At the global level was the main

source of information the WB database „World Development Indicators“, at the national and sub-national levels these were the statistical yearbooks of the Czech Republic and its regions.

*Data preparation* for statistical analyses consisted mainly from data screening and testing the preconditions for statistical analyses (data normality, variance, linearity, correlation of data used etc. ).

*Statistical analysis* was the main step of the work. It was based mainly on the methods of the descriptive statistics (data trimming, weighted arithmetic means... ). Results were converted into the common relative scale (e. g. 0-1, percentage scale... ). For data preparation and analysis we have used mainly the NCSS software package.

*Interpretation of results* was the final step of our work done at all levels. We have evaluated the progress (rank) of world countries (regions) in the way towards sustainability and its aspects, and in the case of CR and its regions we have tried to express the recent trends in the area of QSL.

## Results

### ***The Sustainable Development Index – The World, 2000-2001***

Sustainable Development Index (SD Index) was developed as part of research work in the Central European Node of the Millennium Project and in the framework of the Global Partnership for Development study in 2001.

The aim of SD Index is a complex expression of state and developmental progress of individual countries towards sustainable development. Structure of SD Index is constructed as pyramid: 58 *variables* are grouped into 14 indicators (*thematic areas*). Each two indicators are grouped into one *major problem area* (there are seven major areas altogether). From these seven equally important major problem areas *overall SD Index* is created.

SD Index was calculated for 146 countries, expressed in relative scale 0 – 1. The higher value of index means better progress towards sustainable development. The overall SD Index is calculated as arithmetical average of partial indexes for 58 variables explored.

The best results of SD Index value reached developed countries of the North and Western Europe (Norway, Finland, Sweden, Switzerland, Austria...), USA, Canada and New Zealand. The worst situation is in countries of Africa (Eritrea, Angola, Burundi, Ethiopia, Chad, Mozambique...), Haiti and Cambodia. For some countries with very low SD Index expected there are not enough data available (Afghanistan, Somalia, Liberia...).

*Basic structure of "Sustainable Development Index" (SD Index)*

Sustainable Development Index (SD Index)	1 - Human rights, freedom and equality	A - Politics and human rights (6 parameters)
		B Equality (3 parameters)
	2 - Demographic development and life expectancy	C - Demographic development (3 parameters)
		D - Life expectancy, mortality (4 parameters)
	3 - Health state and health care	E - Health care (5 parameters)
		F - Diseases and nutrition (6 parameters)
	4 - Education, technologies and information	G - Education (3 parameters)
		H - Technologies and information sharing (5 parameters)
	5 - Economic development and foreign indebtedness	I - Economy (4 parameters)
		K - Indebtedness (3 parameters)
	6 - Resource consumption, ecoefficiency	L - Economy - genuine savings (4 parameters)
		M - Economy - resource consumption (4 parameters)
	7 - Environmental quality, environmental problems	N - Environment - natural resources, land use (4 parameters)
		O - Environment - urban and rural problems (4 parameters)

We can see very similar picture in the most of the problem areas evaluated. Outstanding are developed countries from the North and West, left behind are the developing countries, mostly the least developed countries from sub-Saharan Africa. As an exception there are problem areas connected with energy consumption, and quality of environment, in which the picture offers quite other view into the world development.

Currently we are developing the actualization of SD Index based on the latest data from the WDI Database, which are valid mostly for year 2000 (we are able to cover 178 countries). We are also focusing at the creation of time series based on the most important development indicators (parameters).

### **Index of Quality and Sustainability of Life - Czech Republic, 2001-2002**

Index of Quality and Sustainability of Life (QSL Index) for the Czech Republic was developed at the Center for Social and Economic Strategies (Charles University, Prague). We tried to express state and future trends of development and life in the Czech Republic.

The Czech Republic, as the only country in Central and Eastern Europe, has joined the three-years *process of sustainable development indicators testing* by the UN Commission for Sustainable Development. But the overall process was realized more due to international commitments than real attempt of politicians or public of the Czech Republic to express and measure sustainability.

We presented in our study the assessment of the Czech Republic quality and sustainability of life indicators (for the period 1990 - 2000) and the outline of probable trends for the nearest period (to 2006) on the grounds of available statistical data.

Quality and sustainability of life index was evaluated as a hierarchic index comprising of twelve partial indexes (sub-indexes) of the *thematic areas* selected, of four *main development areas* indexes and one integrated (aggregated) index.

*Basic structure of "Life quality and sustainability index for the Czech Republic" (main development and thematic areas)*

Life quality and sustainability index	Socio-political area	International position (6 parameters)
		Internal security and socio-political situation (10 parameters)
	Social area	Demographic development (4 parameters)
		Standard of living of inhabitants (9 parameters)
		Inhabitants' health condition and health care (10 parameters)
		Education, science and research (7 parameters)
		Access to information, process of informing (8 parameters)
	Economic area	Economy effectiveness and economic development (5 parameters)
		Indebtedness and balance of economy (4 parameters)
		Selected economic indicators (9 parameters)
	Environmental area	Natural resources consumption, eco - efficiency (5 parameters)
		The environment quality (24 parameters)

The issue areas were selected to express all elemental factors of the Czech society development in the period of the last decade and to reflect priority problems of the next development. Life quality and sustainability assessment in the Czech Republic was calculated from 101 indicators from various development areas.

The indexes were calculated at all levels as an arithmetic average of the indicators transformed entering the calculation, for each year separately. The indicators were transformed to unified scale <0,1>, where 0 = the most unfavourable indicator value in the assessed period of 1990-2006 and 1 = the most favourable value with regard to life quality and sustainability. The higher index value means better life quality of life.

The period 1990 - 92 was characteristic in the Czech Republic for a stagnant quality and sustainability of life index. The stagnation was mainly caused by the unfavourable economic development. On the contrary, in the environmental area was reported steeply positive development. The period of first four years of independent Czech Republic (1993-96) was characteristic by the positive development in the economic and socio-political area. On the contrary, the environmental area after the initial rise reported stagnation. The year 1999 seemed to be crucial - all development areas of society reported improvement of the index value. The next estimation of development for the period 2003 - 2006 seems to be positive, the index value should further improve. The main factors of the improvement should be the environmental and after certain period social as well. On the contrary, we can expect stagnant and fluctuating development in the socio-political area, mainly due to negative trends in the area of the internal as well as international security.

### **Regional Human Development Index - Regions of the Czech Republic, 2002**

Regional Human Development Index (HD Index) for the Czech Republic was developed in the framework of the "National Human Development Report for the Czech Republic", which was issued by above mentioned CESES research team in Prague.

Although the Czech Republic is classified as a developed country with high quality of life, one overall index at national level cannot express the differences in individual areas sufficiently (especially in the social and economic areas) as well as it cannot express sufficiently differences in individual regions within the Czech Republic.

Quality of life in the Czech regions is understood as a total of social, economic, community and environmental factors, which enable to live a long, healthy and creative life in adequate social and economic conditions. This definition corresponds to the human development concept of the UNDP.

The Regional Human Development Index in the Czech Republic was structured as a hierarchic system based on one *aggregated comprehensive index*, three *main development areas* (which are identical with three basic preconditions for human development according to UNDP) and eight *thematic areas* of human development.

Space units for the study at regional level have been set by the administrative sorting in the Czech Republic – 14 regions corresponding to the third level of the Classification of Statistic Space Units NUTS in the European Union. 39 indicators (independent variables) were used for calculation of the index.

*Basic structure of "Regional Human Development Index for the Czech Republic" (main development and thematic areas)*

Regional Human Development Index	Long and healthy life expectancies	Demographic expectancies (3 parameters)
		Health and people' safety (7 parameters)
		Quality of the environment (7 parameters)
	Creative life with sufficient education expectancies	System of education and learning level (5 parameters)
		Family and social cohesion (4 parameters)
		Work, opportunities of social application (4 parameters)
	Adequate standards of living expectancies	Economic effectiveness of region (4 parameters)
		Social status of people (5 parameters)

The average of the given indicator of the Czech Republic (representing 100%) was used as a comparative level for all the regions. Individual regions attained the level higher than 100% in the case the value of the given indicator in relation to the quality of life was more favorable than the national average, and, on the contrary, lower than 100% in the opposite case.

Contemporary quality of life was significantly different in Prague (significantly higher than in all the other regions). In two boundary regions – northeast part and northwest part of the Czech Republic – there was significantly lower quality of life than in other regions. The differences between more prosperous and less prosperous regions constantly increased. This fact was obvious particularly in relation of Prague to other regions.

## Conclusions

As a conclusion we would like to express our belief, that the *evaluation and interpretation of quality and sustainability of life is possible and could be useful* not only for research purposes, but also as a important instrument for strategic planning and decision making.

*SD Index* represents one possible methodological approach how to quantify and measure progress of individual countries on their way towards sustainable development. The biggest *advantage* of SD Index is that variables are taken from accessible world data sources, which are regularly evaluated and renewed. Just two principle data sources were used – World

Development Indicators of the World Bank, and UNDP Yearbook Human Development Report. Therefore it is possible to make time series for last ten years and extrapolate trends for the near future.

Disadvantage of SD Index is that it does not work with the best possible set of variables but just with the best available set of variables, which can be found without additional research. Its expression is strongly connected with our subjective perception of quality and sustainability of life.

We presented here only *one of a variety of possible methodological approaches*. In our opinion it is rather clear and methodologically sound, but its biggest disadvantage is based on subjectivity of aggregation process. Value- and knowledge-based system of the research team is the main factor of creating the model and aggregating the independent variables into dependent resulting index.

This shortage is main challenge for our work, which is under progress now – we are looking for *possibilities of creating a new approach for evaluating a state and progress towards sustainability and quality of life*. This approach should be based on independent multivariate statistical operations, which are working without direct driving of researchers and which we hope will lead to interesting alternative results.