

Sustainable Development Indicators at the Regional Level in the Czech Republic

Jakub Fischer¹ | *University of Economics, Prague, Czech Republic*

Karel Helman² | *University of Economics, Prague, Czech Republic*

Jana Kramulová³ | *University of Economics, Prague, Czech Republic*

Ludmila Petkovová⁴ | *University of Economics, Prague, Czech Republic*

Jan Zeman⁵ | *University of Economics, Prague, Czech Republic*

Abstract

Sustainable development has been the topic of expert debates since the 1970s and remains relevant until now. The issue is dealt with intensely by a lot of international institutions (e.g. Eurostat, UN, OECD). A common objective is to identify the domains of sets of sustainable development indicators, establish these sets, compile a smaller set of indicators suitable for international comparison and identify the sources of available data. Both the national and regional level of the issue is of extreme importance.

This paper presents the outcome of an initial stage of our project. Its aim is to verify the set of sustainable development indicators for Czech regions (NUTS 3) that are used by the Czech Statistical Office. The principal task is to determine the availability and usability of the data for further statistical processing and tackle problems that may arise. The adjusted data set will then be used for further statistical analyses.

Keywords

Sustainable development indicators, Czech regions NUTS 3, adjusted data set, statistical analysis

JEL code

Q01, Q56, R11

INTRODUCTION

Sustainable development has been the object of attention for more than 40 years. Numerous studies, analyses and comparisons have been published, covering not only global and national but also regional aspects of the issue. In our view, however, the methodology of these studies has to be subjected to close scrutiny. Firstly, the indicators that are employed in comparisons should be thoroughly analysed from the point of view of their quality, accuracy, relevance, availability and mutual relationships. The indicators have

¹ University of Economics, Nám. W. Churchilla 4, 130 67 Prague, Czech Republic. Corresponding author: e-mail: fischerj@vse.cz, phone: (+420)224095737.

² University of Economics, Nám. W. Churchilla 4, 130 67 Prague, Czech Republic.

³ University of Economics, Nám. W. Churchilla 4, 130 67 Prague, Czech Republic.

⁴ University of Economics, Nám. W. Churchilla 4, 130 67 Prague, Czech Republic.

⁵ University of Economics, Nám. W. Churchilla 4, 130 67 Prague, Czech Republic.

to be selected according to these criteria. Secondly, the choice of a suitable methodology of aggregation is required for both multiple comparison and a composite indicator construction approach. The justification of the selection of indicators in particular is sometimes missing (or not sufficient) in the projects on the issue of sustainable development. The third important issue is the data coherence in time and space. According to the space coherence requirement at the regional level (especially for smaller countries like the Czech Republic) it is likely for the indicators to be defined consistently, but it is necessary to ensure this coherence for the cases of national comparisons as well. The second dimension is the requirement for the comparability in time. This is a crucial topic particularly in the case of data that are subject to ordinary and extraordinary revisions (e.g. data from national and regional accounts).

The purpose of the present paper is to select appropriate partial indicators of sustainable development for the case of the Czech Republic at the regional level (NUTS 3 level). Recently adopted approaches are taken into account as the basis on which the indicator properties (including their availability at the NUTS 3 level) are analysed. Finally, a set of partial indicators that can be employed for further analyses is presented.

1 MEASUREMENT OF SUSTAINABLE DEVELOPMENT

1.1 Sustainable development and its measurement at the national level

Sustainable development is a broad concept. The most widespread and well-cited definition comes from G. H. Brundtland (WCED, 1987, pp. 8): *“Humanity has the ability to make development sustainable – to ensure that it meets the needs of the present without compromising the ability of future generations*

to meet their own needs”. There are other similar definitions available (for details see Macháček, 2004, pp. 28–29 or Nováček, 1996, pp. 16–19).

The sense of sustainable development is to balance its economic, social and environmental pillars. The principles of sustainable development have influenced regional strategies at different levels as well as the world of business (particularly in the scheme of corporate social responsibility). Although the purpose of sustainable development is patently obvious, it is not clear how to properly measure such a complex phenomenon.

There are various approaches to statistical assessment of sustainable development, usually dealing with the national level of the issue (e.g. Italian research institution Fondazione Eni Enrico Mattei [FEEM, 2012], Slovak Centre for Economic Development [CPHR, 2012] or German Statistical Office [2012]).

In the Czech Republic, sustainable develop-

ment is also assessed mostly at the national level. In 2001, the European Union adopted the first Sustainable Development Strategy (hereafter SDS) based on the Lisbon strategy. Having embraced the EU SDS three years later, the Czech Republic has updated it several times under the common title of Renewed Sustainable Development Strategy. The document covers the following main areas:

- competitiveness of the economy,
- protection of the environment, natural resources and landscape,

Figure 1 Sustainable Development Model



Source: Own construction

- cohesion and stability,
- research, development and education,
- European and international context,
- governance.

The developments in the above areas are evaluated in the Progress Report on the Czech Republic SDS (Government Council for Sustainable Development et al., 2009) issued by the Ministry of Environment on the basis of indicators that are monitored by the Charles University Environment Center. This Progress Report includes more than 30 indicators divided according to the aforementioned areas and compiled on the basis of the verified data and official methodologies. During the works on our project, new Progress Report was published in the year 2012. (Government Council for Sustainable Development et al., 2012)

1.2 Sustainable development and its measurement at the regional level

A more complicated situation arises when focusing on lower administrative units. Attention has been paid to the monitoring of sustainable development at the local level in recent years, especially in the so called “micro-regions” or at the municipality level (for more details see e.g. Timur, 2012). However, the possibilities of statistical data processing at the local level are rather problematic due to a small number of official – no matter how thoroughly conducted – surveys. In spite of the limited amount of data and different data requirements in comparison with the national level, questionnaire surveys are often launched to find out about public opinion on particular issues. But it is difficult to make spatial and time comparison of the country regions. Only local surveys of a limited scope are carried out.

Even at this level, however, the attempts of sustainable development assessment are rather scarce. Methodology comparison as well as the comparison of results is, therefore, almost beyond feasibility. The year 2005 can be marked as a transition point, when model sustainable development strategies of two regions (Liberecký and Ústecký) were created as an output of a project entitled “Support for the Preparation of Sustainable Development Strategy in Selected Regions of the Czech Republic”. The main difference from the previous strategic materials at the NUTS 3 level is that SDS places emphasis on a longer time perspective (from 2006 to 2020). Another important difference is the imbalance of the three basic – economic, social and environmental – pillars. Based on the SWOT analysis, the priorities and strategic objectives for particular pilot regions had been set. For monitoring and regular evaluation of the regional strategy implementation (i.e. finding out whether and how the objectives are achieved), the authors of the strategy proposed a set of indicators. The point is, however, that not all selected indicators for particular model regions are available in other regions. Therefore, the set of indicators used in pilot strategies cannot be considered as unalterable.

Current development indicates that some regions, not being able to create a separate strategy of sustainable development, will integrate the issue of sustainability into existing strategic documents. This will require selecting the indicators that could be employed for the assessment of specific regional goals.

Some regional comparisons are also available, but mostly in the form of quality of life assessments (Mederly et al., 2004) or statistical overviews without a deeper analysis and regional comparison (Czech Statistical Office, 2010). It is usually difficult to use these sources for broader statistical analyses, particularly due to the fact that:

- some data originate from questionnaire surveys carried out irregularly and only in small territories,
- each region compiles its own set of indicators (there is no unified set),
- qualitative and individual assessments are made.

For meaningful statistical analyses, it is necessary to have a high-quality initial data set at one’s disposal. In order to ensure a better comparability it is useful to select such indicators that are broadly available in regions not only for single country, but eventually for other countries as well. Concerning just local

specificities makes it impossible to construct subsequent comparative analyses. The arrangement of our panel data matrix will be dealt with later.

1.3 An overview of the selected Czech regional sets of indicators

Let us introduce more closely the two regional examples of sustainable development assessment in the Czech Republic that were mentioned above. One of them can be found in a publication issued by the Czech Statistical Office (hereafter CZSO). Its main drawback is that its updates appeared irregularly (in the years 2007 and 2010), thus not allowing easy prolongation of the indicators' time series. On the other hand, being borrowed from the national indicator set used by the Charles University Environment Center and the Czech Ministry of Environment in the Progress Report on the Czech Republic Sustainable Development Strategy (Government Council for Sustainable Development et al., 2009), the set of indicators in the above publication is adjusted for the needs of regional assessments.

Another example is a joint project of three co-researchers (see Mederly et al., 2004). However, it was just a single attempt to compare regions from a sustainable development view point. Moreover, its outcomes are already behind the times (published in 2004), with no real chance of being revised and republished. The research focused on both international and regional levels of comparison (NUTS 3 and LAU 1), emphasis having been laid on the quality of life in particular. The main drawback of this approach is that the authors employed all the indicators available without selecting just the proper and useful ones. On the other hand, a mix of *ex-ante* (factual) and *ex-post* (using only available data) approach was adopted.

2 SELECTION OF INITIAL INDICATOR SET

For the reasons mentioned in Chapter 1.2, the possibility of monitoring sustainable development indicators in territorial administrative units at a lower than NUTS 3 level (14 regions in the Czech Republic) was ruled out. Only in the case of NUTS 3 level can the improved data sources based on the official statistics be found. This does not allow us to study sustainable development in the Czech Republic at a lower regional level in detail, which would be more suitable for the identification of regional disparities in some sustainable development aspects. A greater number of observations would be also more appropriate so that statistical methods could be employed for further analyses. For the reasons already mentioned, in order to facilitate the selection of a good data source, the level of NUTS 3 territorial administration unit was chosen. We decided to draw inspiration for a follow-up analysis from CZSO sources (Czech Statistical Office, 2010), having made – predictably – slight data adjustments (see below).

As already mentioned, a regional sustainable development comparison on the basis of a uniform indicator set was carried out and subsequently revised by the CZSO in 2007 and 2010 respectively. The employed indicators originate from the national SDS 2004 and particular progress reports. Since there are no data available at the regional level, it is not possible to determine all the indicators (examined and evaluated at the national level) for the NUTS 3 level. For this reason, several adjustments of the national indicator set were carried out. Some indicators were replaced by different ones available at the regional level. Not all indicators, however, have a suitable substitute. That is why some areas were not included at all (e.g. corruption perception index, consumption of primary energy sources, common species of wild birds index, alien plant species index, pesticide consumption, etc.). Furthermore, a principle was stressed that the data for further calculation should be obtained from periodic surveys or other sources regularly providing reliable data in the time series.

The Center for Social and Economic Strategies (Mederly et al., CESES 2004), on the other hand, attempted to find the set of indicators at the regional level, having compared *a priori* and *a posteriori* approaches. It was one of the first attempts in this respect in the Czech Republic, even though the research project dealt predominantly with the quality of life and human resources development evaluation. We will update these already outdated results and proceed further in relevant statistical analyses. This will

Table 1 Economic pillar

Indicators
Gross Domestic Product per Capita in thousands of CZK (current prices)
Change in Gross Domestic Product (Development of GDP in constant prices)
Labour Productivity (Development of GDP per 1 employed)
Local Government Deficit / Surplus
Gross Value Added in Services (Share of the Tertiary Sector in Gross Value Added in %)
Investment Rate in %
Net Disposable Income of Households per inhabitant in thousands of CZK
Small and Medium-sized Enterprises (Share of Small and Medium-sized Enterprises in the Total Employment in %)
Transport Infrastructure – Density of the Motorway Network in km per 100 km ²
Transport Infrastructure – Railway Lines Density in km per 100 km ²
Freight Transport (Excluding Transit, including Road, Rail and Water Transport per thousand of CZK GDP, in kg)
Passenger Transport (within the Region by Public Road and Rail Transport per Capita)
Research & Development Expenditures to GDP in %

Source: Czech Statistical Office, 2010

Table 2 Social pillar

Indicators
Households with Net Income below Subsistence Minimum
General Unemployment Rate in % (Aged 15+)
Registered unemployment Rate in % (Aged 15+)
Employment of Elderly Workers (Employment Rate of People Aged 55–64 in %)
Employment of Women in %
Mortality (Standardized Mortality Rate – Number of Deaths per 1000 mid-year Population)
Life Expectancy (of men and women at birth in years)
Highest Level of Education Attained (Share of the Population with Tertiary Education in the Population Aged 15 and Over in %)
Internet Access (Share of Households connected to Internet in %)
Local Government Expenditures on Culture per inhabitant in CZK
Coverage of the Czech Republic's Territory by Approved Town and Country Documentation of Municipalities in %
Average Duration of Court Proceedings From the Idea to the Legal Effect Day in Days
Civil Society – Political Participation (Turnout in Elections to Municipal Councils, Regional Councils and to the Chamber of Deputies in %)
Women and Men in Politics (Share of the Total Number of Women Elected Representatives in Elections to Municipal Councils and Regional Councils in %)
Civil Society – Civil Participation (Mid-year Population to Non-profit Organization)

Source: Czech Statistical Office, 2010

Table 3 Environmental pillar

Indicators
Arable Land in %
Consumption of Industrial Fertilizers in Pure Nutrients in kg/ha of Arable Land
Coefficient of Ecological Stability
Organic Farming (Share of organically farmed land in the total area of agricultural land in %)
Index of Defoliation in %
Share of Broadleaved Species in %
Quality of Surface Water (Share of profiles in IV. a V. Class of Pollution (group A – General, Physical and Chemical Indicators in %))
Areas with Deteriorated Air Quality in %
Nitrogen Oxide Emissions (REZZO 1–4) in tonne per km ²
Sulphur Dioxide Emissions (REZZO 1–3) in tonne per km ²
Waste Generated by Enterprises in kg per thousand CZK of GDP
Municipal Waste Generated in kg per inhabitant
Acquired Investment Expenditures on Environment Protection according to Location of Investment in CZK per inhabitant
Non-investment Expenditures on Environment Protection according to Region of Residence of the Investor per million CZK of Regional GDP

Source: Czech Statistical Office, 2010

allow us to perform a deeper examination of both the interactions (and developments) of particular regions in the Czech Republic and various aspects of sustainable development.

As already mentioned, our study is based on the indicator set published by the CZSO. The indicators are divided in accordance with the three customary pillars of sustainable development – economic, social and environmental.

The list of all considered indicators (i.e. the initial data set) is shown in Tables 1–3, a brief description being provided in the Annex.

The indicator set presented here was used by the CZSO to assess sustainable development at NUTS 3 level. Some indicators, however, are observed only in *ad-hoc* surveys. Moreover, there are frequent changes in the methodology of data collection and further primary data handling. The indicators whose values cannot be determined for the regions (e.g. the length of court proceedings – see below) represent a special case.

Our aim is to supply these indicators with the data that would allow us to compare regions in space and time. This means not only determining the values for one reference year, but also supplementing the indicators with the longest possible time series. The data have to ensure comparability over time as well, not only from a methodological but also factual point of view.

3 THE CREATION OF THE FINAL DATA SET FOR FURTHER ANALYSIS

In the previous chapter, the construction of the initial data set was described. Here we will dedicate ourselves to creating the final data set that will be used for further analysis in follow-up research. The indicators that will not be dealt with in this chapter remained unchanged in the final data set, thus being the same as those included in the initial data set. In this chapter, all the modifications performed to the initial data set will be considered.

3.1 Discarded indicators

Regrettably, several indicators had to be discarded from the data set. These were as follows:

Registered Unemployment Rate. There were several reasons for discarding this indicator. First, the value of the Registered Unemployment Rate depends, to a certain extent, on decisions and measures taken by the government. Second, all the other [un]employment indicators in the initial data set are constructed on the grounds of the same ILO-based (International Labour Organization) methodology. Although it is true that the Registered Unemployment Rate has become more comparable with similar rates used in the EU and more consistent with ILO-based methodology since 2004, this indicator is still focusing just on registered job-applicants. Conditions for registration of unemployed at Labour Offices may vary in different countries. This also means that indicators such as the General Unemployment Rate – in comparison to the Registered Unemployment Rate – may be better received and understood overseas. Therefore we have decided to discard this indicator.

Average Duration of Court Proceedings. All the five sub-indicators had to be discarded because court districts (i.e. administrative regions till the year 2001) do not coincide with present administrative regions (NUTS 3 level) and it was impossible to convert their values.

Women and Men in Politics. In fact, there were two indicators expressing the proportion of women among all members of the elected bodies – one for a regional and the other for local level. The point is, however, that there were some years when no elections were held; thus an estimation of values for the missing years would be unavoidable for the construction of complete time series. It would be possible to calculate suitable estimations if the researched phenomenon was comparable between two different types of elections. Unfortunately, because of the incomparable numbers of representatives being elected at regional and local levels, the results of the two types of elections (i.e. the proportion of women among all the representatives) cannot be used to estimate the values in the “missing” years. Due to the facts mentioned above, it was impossible to construct complete time series and the solution chosen was to discard the two sub-indicators from the initial data set.

Index of Defoliation. The decision to discard this indicator was also based on serious reasons. The key one is that substantial differences in methodology make it impossible to construct relevant time series. In other words, even the values for a single region are almost incomparable within a year-to-year perspective. Moreover, the data for the Prague region were missing completely, the year 2006 being the last one with the data available for all the other regions.

3.2 Indicators with shortened time series

For certain indicators, gaps in the time series appeared as there were no data available for particular years. For some of those indicators, the nature and development of the time series make it very difficult (or almost impossible) to calculate relevant estimates for the data in the missing years. Since the complete time series are required for further analysis, the following three indicators' time series had to be shortened:

Households with Net Income below Subsistence Minimum. The data for the years 2001 and 2003 were missing completely, so the time series were shortened by removing the years 2000 and 2002 from the initial data set. Consequently, the first year in the final data set is 2004.

Organic Farming. The regional data on the proportion of organically cultivated soil to the total area of agricultural land are only available for the years 2003 and 2006–2010. For 2004 and 2005, there are only data available for the whole Czech Republic. Since our project deals with regions, both the years 2004 and 2005 together with 2003 were removed from our initial data set, resulting in very short time series for the period 2006–2010 in the final data set. For the earlier years, only the proportion of organizations that practice organic farming was known; the idea of using an indicator defined with this respect was also considered. Nevertheless, the data based on the two respective definitions turned out to be incomparable and so the replacement of an original form of indicator with an alternative was not possible.

Passenger Transport. For this indicator, in the years 2001 and 2002 a completely different methodology was employed – railroad transport not being included in the values gathered. This made these two years' values incomparable to the remaining ones. Because of that, the years 2001 and 2002 had to be removed from the initial data set.

3.3 Indicators with estimated (missing) values

Unlike the indicators mentioned in the previous sub-chapter, the nature and development of the time series of indicators presented in this chapter allowed us to calculate relevant estimates of the data in the missing years. It is to be stressed that the calculation of estimates is not a key task of our project and so the comparison of estimation methods (in order to obtain the best estimates) was not made. The objective was to supplement the missing values with relevant (estimated) data using a method that may be easily employed in the future. Therefore, we have decided to use the simplest methods that would produce satisfactory results. The indicators with some missing (and estimated) values are as follows:

Passenger Transport. There was a problem with the Prague region value for the year 2005 since it did not include the Integrated Traffic System. The development of the time series allowed us to easily estimate the missing value as the average of 2004 and 2006 values.

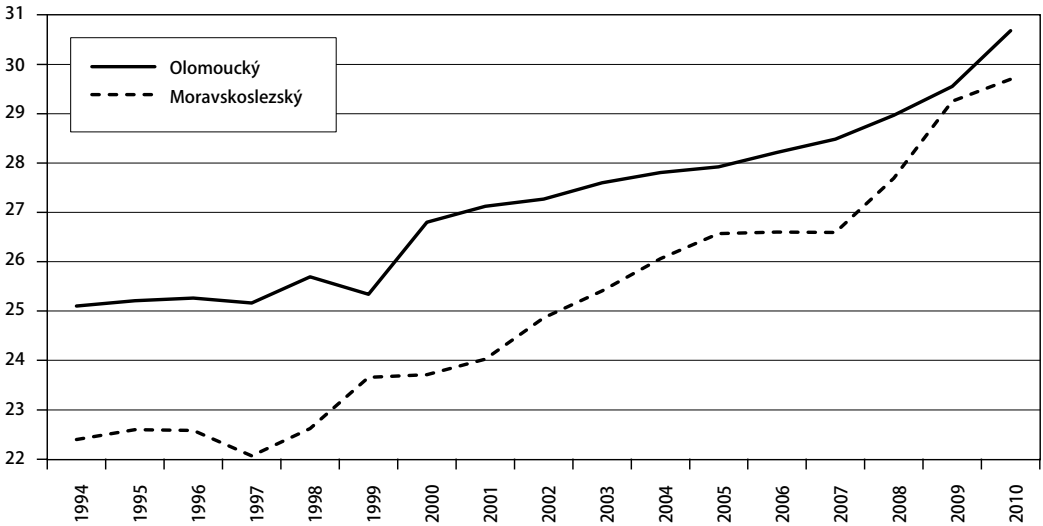
Internet Access. The data for the year 2004 were missing completely. Again, the development of the time series and the nature of this indicator allowed us to employ the simplest method for the estimation of missing values. The 2004 data were calculated as a simple arithmetic average of the two subsequent years, so that the full range from the year 2003 to 2010 is now available for further analysis.

Quality of Surface Water. The two missing values (2005 and 2007 for the Prague region) were estimated on the basis of an expert assessment.

Share of Broadleaved Species. For Olomoucký and Moravskoslezský regions, the data from the period 1994–1996 were missing in the initial data set. The development of the time series allowed us to consider two methods for the calculation of estimates – namely the trend analysis and multiple linear regression

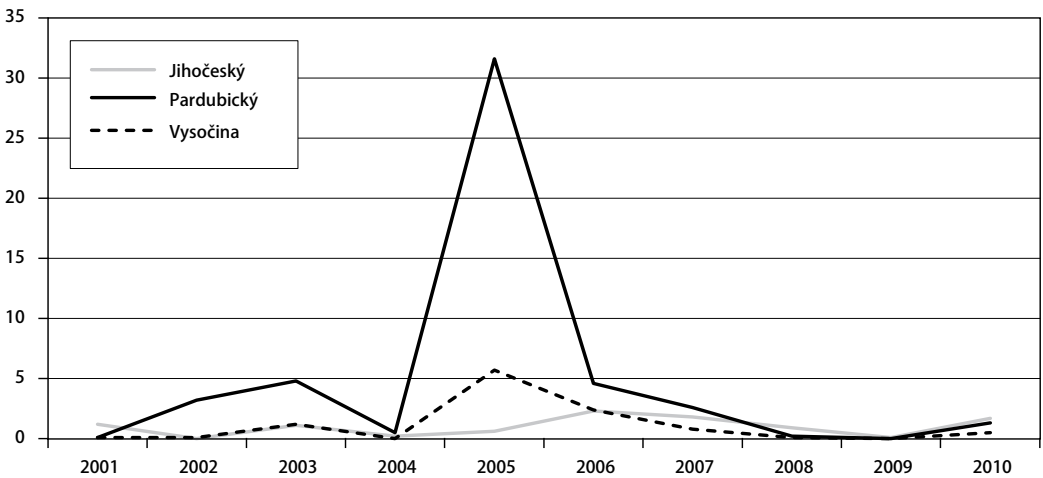
approach. Since the aim was to gain relevant estimates (to obtain the missing numbers) and there was no reason for examining any relationships (e.g. between Olomoucký and other regions) at this stage of our project, all the models were constructed without carrying out deep error-diagnostic tests. In this sense, both above mentioned approaches proved to be relevant – having produced meaningful results. Finally, the regression-based estimates were selected for the final data set because of higher statistical significance; all the parameters involved reached the 5% significance level. The results can be seen in Figure 2.

Figure 2 Share of Broadleaved Species, Olomoucký and Moravskoslezský regions (in %)



Source: Own construction

Figure 3 Areas with Deteriorated Air Quality, Jihočeský, Vysočina and Pardubický regions (in %)

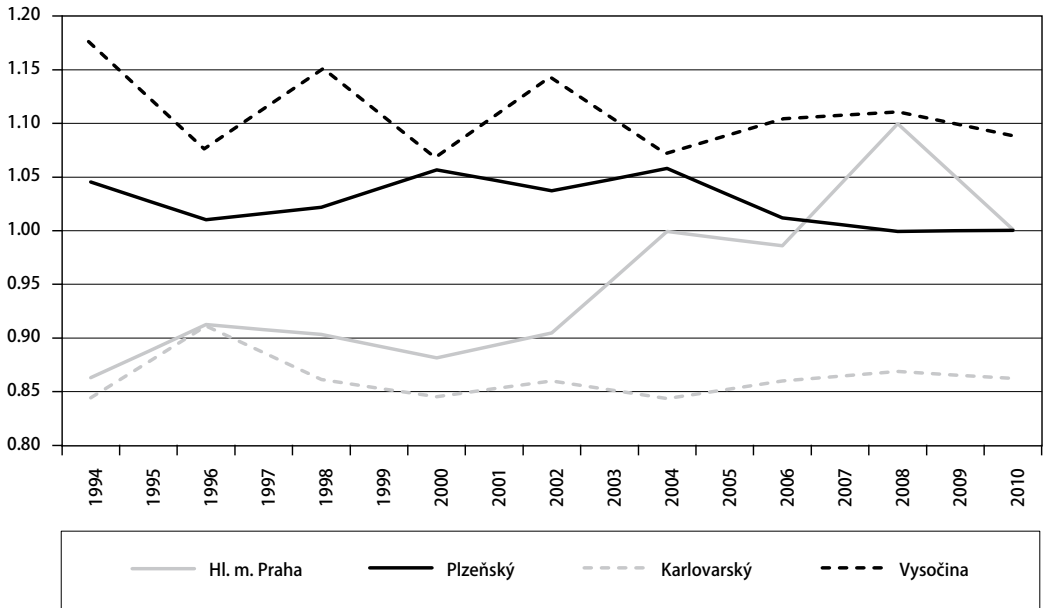


Source: Own construction

Areas with Deteriorated Air Quality. Several values were missing in the initial data sets for Jihočeský (the year 2001), Vysočina (2004) and Pardubický (2002, 2004, 2008 and 2009) regions. Unlike the previous indicator, the trend-analysis approach is not applicable in this case as there is no clear development in the investigated time series (a few high peaks occurred). Consequently, the multiple linear regression models (with 5% significance-level parameters) had to be employed. The resulting estimates had to be further adjusted as they were sometimes slightly below zero. In such a case the final estimate applied for the final data set was adjusted to zero. The final results are shown in Figure 3.

Civil Society – Political Participation. This indicator is expressed in the initial data set as the election turnout rate (in percent). Three types of elections – general, regional and municipal – are involved (i.e. there are three corresponding sub-indicators). Reflecting all three types of elections and beginning with the year 1994, only even years (1996, 1998 and so forth) are covered; in those years at least one type of elections was held. Since this indicator is unique among all the others, we have decided not to discard it. Several steps were taken in the process of time series construction. First, it was necessary to make all the values in the initial data set (coming from different types of elections) comparable. The method chosen was to transform them into the share of regional election turnout within that of the whole Czech Republic. The values transformed in this way then indicate whether the regional election turnout is above or below the total turnout. The values transformed in this way then indicate whether the regional election turnout is above or below the total turnout. Fortunately, all the three types of elections proved to be excellently comparable. The second phase was the calculation of averages in the years when more than one type of election was held. In the third stage, the values for odd (missing) years were estimated as the average of the two subsequent years. The results for the selected regions are presented in Figure 4.

Figure 4 Civil Society – Political Participation, share of regional election turnout in the whole Czech Republic election turnout



Source: Own construction

3.4 Problematic indicators

In the previous text, all the adjustments already performed to the initial data set were described. All the other indicators remained unchanged. Nevertheless, we found several of them problematic in some way. It should be also stressed that the list below is not complete in any sense as more difficulties may appear during further analysis. At this stage of our project, the final decision how to deal with already identified “problematic” indicators has not been made. Still it is a good idea to summarize the problematic indicators and describe their weaknesses.

Labour Productivity. This indicator expressed by the usage of working time (hours worked) does not have much relevance in the case of regions. For our project purposes and because of a relevant economic insight, the phrase “per an employee” was chosen, although it brings some difficulties as sudden local peaks and minimums appear in the time series.

General Government Deficit/Surplus. This indicator belongs to the problematic ones due to strong variability of the time series. Its use will be considered even more carefully in the future. (A more suitable indicator would be, for instance, the regional surplus of funding. This entry, however, is not available for the Czech Republic yet.)

Coverage of the Czech Republic’s Territory by approved Town and Country Documentation of Municipalities. Unfortunately, this indicator defined as “territory coverage” could not be used for a simple reason – there are no data available. In regular time series only the number (not the location) of municipalities with approved documentation is obtainable. On the grounds of both factual and numerical analysis, we decided to use the rate of municipalities with approved town and country documentation.

Quality of Surface Water. Due to a low number of measuring stations in Prague and Pardubický regions, the time series consist of only a few unique values. For the remaining twelve regions, the values of this indicator are considerably different. This makes all the regions rather difficult to compare.

Areas with Deteriorated Air Quality. As already mentioned in the previous sub-chapter, there is no clear development (trend) in this indicators’ time series, several high peaks appearing and high year-to-year differences occurring in some of them in different years and regions. Possibilities of further data transformation will have to be considered in the future.

CONCLUSION

In this paper we contribute to the discussion on indicators of sustainable development in the Czech Republic at the regional level. Several indicator sets have been recently used at the national level. At the first stage of our project we verified the usability of these indicators for the NUTS 3 level. The availability of data at the regional level was checked, a significant amount of work being done on supplementing the regional indicators (and their time series) with concrete data.

Having adapted the national indicator set to the regional level, we made four types of adjustments. At first, we discarded some indicators from the regional sets. Then we had to shorten the time series of several indicators. After that we estimated the missing values. Finally, we identified some problematic indicators that should be deeply analyzed before they can be applied in further research.

The constructed set of indicators will be used for further analysis; e.g. regional comparison of sustainable development and the construction of regional composite sustainable development indicator.

ACKNOWLEDGEMENTS

This paper has been prepared under the support of the University of Economics in Prague, project No. 11 / 2012 “Construction and verification of sustainable development indicators in the Czech Republic and its regions”.

References

- CENTRE FOR ECONOMIC DEVELOPMENT. *CPHR National Human Development Report – Slovak Republic 2000* [online]. Bratislava: CPHR. [cit. 25.9.2012]. <<http://www.cphr.sk/english/undp2000.htm>>.
- CZECH STATISTICAL OFFICE. *Vybrané oblasti udržitelného rozvoje v krajích České republiky 2010* (Selected Areas of Sustainable Development in the Regions of the Czech Republic 2010). Prague: Czech Statistical Office, 2010, 126 p. ISBN 978-80-250-2009-8.
- FEEM SI. *FEEM Sustainable Index* [online]. Venice: FEEM. [cit. 25.9.2012]. <<http://www.feemsi.org/index.php>>.
- GERMAN STATISTICAL OFFICE. *Publikationen im Bereich Umweltindikatoren / Nachhaltigkeit* [online]. Wiesbaden: Statistisches Bundesamt, 2012. [cit. 25.9.2012]. <<https://www.destatis.de/DE/Publikationen/Thematisch/UmweltoekonomischeGesamtrechnungen/Umweltindikatoren/Indikatoren.html>>.
- GOVERNMENT COUNCIL FOR SUSTAINABLE DEVELOPMENT, MINISTRY OF THE ENVIRONMENT. *Progress Report on the Czech Republic Sustainable Development Strategy. Summary*. Prague: Ministry of the Environment, 2009, 32 p. ISBN 978-80-7212-492-3.
- GOVERNMENT COUNCIL FOR SUSTAINABLE DEVELOPMENT, MINISTRY OF THE ENVIRONMENT. *Progress Report on the Czech Republic's Strategic Framework for Sustainable Development*. Prague: Ministry of the Environment, 2012, 170 p. ISBN 978-80-7212-573-9.
- MACHÁČEK, J. *Ekonomické souvislosti využívání kulturně historických lokalit* (Economic Context of the Use of Cultural and Historical Sites). Prague: Oeconomica, 2004, 122 p. ISBN 80-245-0765-0.
- MEDERLY, P., TOPERCER, J., NOVÁČEK, P. *Indikátory kvality života a udržitelného rozvoje – kvantitativní, vícerozměrný a variantní přístup* (Indicators of Quality of Life and Sustainable Development – Quantitative, Multidimensional and Alternative Approach). Prague: UK FSV CESES, 2004, 117 p. ISBN 80-239-4389-8.
- NOVÁČEK, P., MEDERLY, P. *Strategie udržitelného rozvoje* (Sustainable Development Strategy). Prague: G plus G, 1996, 196 p. ISBN 80-901896-2-6.
- TIMUR. *Týmová iniciativa pro místní udržitelný rozvoj* (Team Initiative for Local Sustainable Development) [online]. Prague: Timur, 2012. [cit. 30.9.2012]. <<http://www.timur.cz/>>.
- WCED. *Our Common Future*. Oxford: Oxford University Press, 1987, 383 p. ISBN 0-19-282080-X.

ANNEX

Table A1 Economic pillar	
Indicators	Description
Gross Domestic Product per Capita in thousands of CZK (current prices)	Essential macroeconomic indicator that is used to determine the level of performance and dynamics of the economy.
Change in Gross Domestic Product (Development of GDP in constant prices)	
Labour Productivity (Development of GDP per 1 employed)	Qualitative indicator of the economic level and competitiveness of the economy. Expresses the efficiency of human labour.
Local Government Deficit / Surplus	Characterizes a balance between the revenue and expenditure side of public budgets, which is an important requirement for the sustainability of public finances. Size of the deficit related to GDP is one of the Maastricht convergence criteria for adopting the single currency Euro.
Gross Value Added in Services (Share of the Tertiary Sector in Gross Value Added in %)	The share of the services sector in the economy is an important indicator of the transition from an industrial to a postindustrial society.
Investment Rate in %	Macroeconomic indicator of future economic development. Characterizes investment activity of the entities in the economy.
Net Disposable Income of Households per inhabitant in thousands of CZK	Characterizes the standard of living and belongs to macroeconomic indicators of population purchasing power.
Small and Medium-sized Enterprises (Share of Small and Medium-sized Enterprises in the Total Employment in %)	Brings the economic significance of groups of small and medium-sized enterprises, which is an important element of stability of economic development and employment due to its flexibility.
Transport Infrastructure – Density of the Motorway Network in km per 100 km ²	Sufficiently dense transport infrastructure is a prerequisite for economic and social growth of the region.
Transport Infrastructure – Railway Lines Density in km per 100 km ²	
Freight Transport (Excluding Transit, including Road, Rail and Water Transport per thousand of CZK GDP, in kg)	Transportation of raw materials and goods is an important prerequisite for economic development, has on the other hand a negative impact on the environment.
Passenger Transport (within the Region by Public Road and Rail Transport per Capita)	Transport of people from an economic point of view is particularly relevant for labour mobility. Public transportation reduces the negative impacts of individual transportation on the environment.
Research & Development Expenditures to GDP in %	The value of expenditures on research and development refers to the ability of the economy to invest in its future development.

Source: Czech Statistical Office, 2010

Table A2 Social pillar

Indicators	Description
Households with Net Income below Subsistence Minimum	It indicates the degree of risk of poverty of households (population).
General Unemployment Rate in % (Aged 15+)	Indicator for the assessment of the situation on the labour market and of the progress of human resources development.
Registered unemployment Rate in % (Aged 15+)	Indicator for the assessment of the unemployment situation in the regions; it indicates problems in the "regional and local" economies.
Employment of Elderly Workers (Employment Rate of People Aged 55–64 in %)	It characterizes the degree of the labour integration of elderly population in the labour market in accordance with the strategy of creating equal opportunities and the fight against all forms of discrimination.
Employment of Women in %	It refers to the status and development in the field of employment of women and the extent of creating equal opportunities.
Mortality (Standardized Mortality Rate – Number of Deaths per 1000 mid-year Population)	It describes the health status of the population and distribution of some types of serious diseases.
Life Expectancy (of men and women at birth in years)	Indicator of the health status of the population and its development.
Highest Level of Education Attained (Share of the Population with Tertiary Education in the Population Aged 15 and Over in %)	It characterizes the educational level of the population, indicates success in the labour market and improvement in the quality of human resources.
Internet Access (Share of Households connected to Internet in %)	It indicates the level of approaching of the so-called information society; access to information and communication technologies is a necessary prerequisite for the development of human resources.
Local Government Expenditures on Culture per inhabitant in CZK	It tells about the level of resources dedicated to the culture in the broader sense – culture as a structured area of interest and activities contributes to the development of an individual and the integration of civil society.
Coverage of the Czech Republic's Territory by Approved Town and Country Documentation of Municipalities in %	It refers to an extent of a comprehensive and functional utilization of municipality area, and to the level of conditions' setting according to the long-term harmony among all natural, civilization and cultural values in the territory, especially with the regard to the care of the environment.
Average Duration of Court Proceedings From the Idea to the Legal Effect Day in Days	Indicator for assessing the performance of a long-term development of the judicial system; powerful judiciary is an essential precondition of a functional state administration and the guarantee of the protection of the personal rights.
Civil Society – Political Participation (Turnout in Elections to Municipal Councils, Regional Councils and to the Chamber of Deputies in %)	It quantifies the degree of the political participation of citizens – it measures the interest of the citizens to actively influence public affairs through voting.
Women and Men in Politics (Share of the Total Number of Women Elected Representatives in Elections to Municipal Councils and Regional Councils in %)	It refers to the degree of involvement of women in political and decision-making positions and the extent of promotion of equality among men and women in society.
Civil Society – Civil Participation (Mid-year Population to Non-profit Organization)	It characterizes the degree of citizens' participation in public affairs in the non-profit sector (the voluntary associating outside the market, state and private life).

Source: Czech Statistical Office, 2010

Table A3 Environmental pillar	
Indicators	Description
Arable Land in %	It captures the share of arable land, which belongs to the unstable landscape elements in the total area of agricultural land.
Consumption of Industrial Fertilizers in Pure Nutrients in kg/ha of Arable Land	It measures the consumption of fertilizers per hectare of arable land; excessive supply of nutrients contributes to the contamination of soil, groundwater and surface water.
Coefficient of Ecological Stability	It reflects the character of the landscape, the degree of human influence, the ratio of ecologically stable (forests, water areas, grasslands, orchards, gardens, vineyards, hop-gardens) and unstable areas (arable land, built-up areas, other areas).
Organic Farming (Share of organically farmed land in the total area of agricultural land in %)	It expresses the share of land managed by farmers without industrial fertilizers, chemicals, hormones or genetic modification.
Index of Defoliation in %	It indicates the health of the forests; demonstrates the influence of emissions, drought and species composition of the trees.
Share of Broadleaved Species in %	Forests with a higher share of broadleaved species are more resistant to weather conditions, drought and insect pests. In the original species composition of Central European flora broadleaved species were represented much higher than it is today.
Quality of Surface Water (Share of profiles in IV. a V. Class of Pollution (group A - General, Physical and Chemical Indicators in %))	It reflects the quality of surface water in water courses through a share of profiles, which are found to have highly and very highly polluted water.
Areas with Deteriorated Air Quality in %	It shows the share of area with the poor quality of the air, which exceed the limit values for the protection of human health.
Nitrogen Oxide Emissions (REZZO 1–4) in tonne per km ²	Nitrogen oxides are one of the main pollutants contributing to the formation of acid rain and ground-level ozone; nitric oxide is one of the greenhouse gases.
Sulphur Dioxide Emissions (REZZO 1–3) in tonne per km ²	Carbon dioxide is one of the main pollutants, which is involved mainly in the creation of acid rain.
Waste Generated by Enterprises in kg per thousand CZK of GDP	Waste can be a source of pollution of all environmental components and handling with it creates economic costs.
Municipal Waste Generated in kg per inhabitant	
Acquired Investment Expenditures on Environment Protection according to Location of Investment in CZK per inhabitant	Expenditures on environmental protection reflect the level of environmental protection by the public and private sectors.
Non-investment Expenditures on Environment Protection according to Region of Residence of the Investor per million CZK of Regional GDP	

Source: Czech Statistical Office, 2010