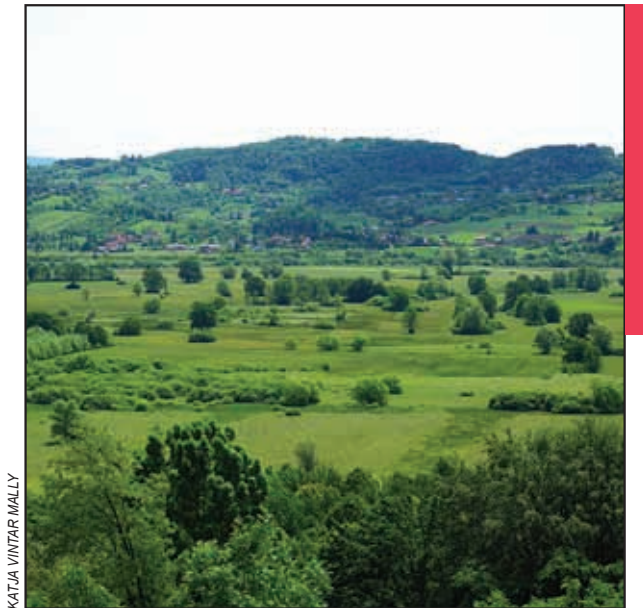


# REGIONAL DIFFERENCES IN SLOVENIA FROM THE VIEWPOINT OF ACHIEVING EUROPE'S SUSTAINABLE DEVELOPMENT

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Jovsi Nature Park: the preserved natural environment is an important potential for the region.

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## **Regional differences in Slovenia from the viewpoint of achieving Europe's sustainable development**

**ABSTRACT:** Within the context of EU efforts to achieve the objectives of sustainable development, this article presents the findings of a study that uses a selection of thirty-two economic, social, and environmental indicators to evaluate the extent of achieving these objectives in Slovenian statistical regions from 2010 to 2014. Based on the favorable or unfavorable state and trends established, the indicator values are assigned scores that make it possible to calculate the average values for individual development areas and their total average (i.e., the indicator of sustainable regional development). The calculations confirmed the hypothesis that the differences between Slovenian regions are the greatest with regard to economic issues and the smallest with regard to environmental issues. Both in Slovenia and in the EU in general, unfavorable environmental trends resulting from unsustainable use of energy and natural resources persist, even though Slovenia's environment remains above average in terms of its conservation.

**KEY WORDS:** sustainable development indicator, sustainable regional development, environmental protection, socioeconomic progress, statistical regions, Slovenia

## **Regionalne razlike v Sloveniji z vidika doseganja trajnostnega razvoja Evrope**

**POVZETEK:** V kontekstu evropskih prizadevanj za doseganje ciljev trajnostnega razvoja so v članku predstavljeni rezultati raziskave, ki z naborom 32 ekonomskih, socialnih in okoljskih kazalnikov vrednoti tozadevno uspešnost slovenskih statističnih regij v obdobju 2010–2014. Glede na ugodnost stanja in trendov so vrednostim kazalnikov pripisane ocene, ki omogočajo izračun povprečij za posamezna razvojna področja in njihovo skupno povprečje (kazalnik trajnostnega regionalnega razvoja). Izračuni so potrdili hipotezo, da so razlike med slovenskimi regijami največje na gospodarskem in najmanjše na okoljskem področju. Tako v Evropski uniji kot tudi v Sloveniji se nadaljujejo neugodni okoljski trendi, ki so posledica netrajnostne rabe energije in naravnih virov, vendar ima Slovenija še vedno nadpovprečno ohranjeno okolje.

**KLJUČNE BESEDE:** kazalnik trajnostnega razvoja, trajnostni regionalni razvoj, varstvo okolja, socialno-ekonomski napredek, statistične regije, Slovenija

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# 1 Introduction

For the past twenty-five years, Slovenia has been striving to achieve sustainable development, the global importance of which was enhanced through the 1992 United Nations Conference on Environment and Development, and the adoption of Agenda 21 (1992). In terms of the efforts made in this regard, Slovenian regions vary in success, but their progress has not been systematically assessed, even though this type of assessment has already been established at the national level and has ultimately already been part of international commitments since Agenda 21 was established (Dahl 2012; Hak, Kovanda and Weinzettel 2012; Waas et al. 2014). In 2001, a special strategy was adopted (A sustainable Europe ... 2001) that requires EU member states to pursue sustainable development; this strategy was renewed in 2006 (Renewed EU sustainable ... 2006) and demands that a special report be submitted every two years on the progress made according to selected indicators for the quality assessment of conditions (Rinne, Lyytimäki and Kautto 2013; van Hees 2014; Sustainable development ... 2015). In addition, Slovenia must pursue sustainable development because this is required by the Europe 2020 umbrella strategy (Europe 2020 ... 2010) and a series of EU sectoral policies. At the national level, the implementation of Slovenia's Development Strategy (Strategija razvoja Slovenije 2005) is monitored through annual reports on development (Poročilo ... 2015) based on a number of development indicators. Sustainable development indicators for the national level have also been defined in a special publication by the Slovenian Statistical Office (Suvorov, Rutar and Žitnik 2010) and the project Indicators of Well-being in Slovenia (Kazalniki blaginje v Sloveniji 2015), which also provides a fairly general assessment of their contribution to wellbeing. All of the indicators mentioned are intended to be used exclusively at the national level, without illustrating regional conditions or any wider or global comparisons.

The regional level is often the most important for achieving sustainable development, and thus appropriate methods for monitoring progress in this area achieved at the level of statistical regions (hereinafter simply »regions«) were already developed more than a decade ago. Thirty-two indicators were defined (six economic, twelve social, and fourteen environmental ones) and used for the first time to study the period from 1996 to 2002 (Vintar 2003) and after that the period from 2003 to 2007 (Vintar Mally 2009a). This article presents the latest findings referring to the five-year period between 2010 and 2014.

By using these indicators, the current conditions and trends in the regions can be analyzed, the level of approaching or drifting away from sustainable development goals can be assessed, the relative position of Slovenian regions can be determined in relation to the national average (from the economic, social, and environmental viewpoints), and the indicators included can be incorporated into an aggregate indicator of sustainable regional development.

This article elucidates the findings for individual areas of sustainable development and ranks regions into types based on their assessed future development potential. The study is based on the hypothesis that in terms of sustainable development the differences between the regions are the greatest with regard to economic issues and the smallest with regard to environmental issues. In the discussion, the Slovenian findings are comparatively contextualized within European sustainable development efforts.

# 2 Methods

In line with the definition of the three basic conceptual fields of sustainable development following the thematic model (Hardi et al. 1997; Indicators ... 2001; Indicators ... 2007), its realization is monitored with economic, social, and environmental indicators. Already in the first study of this type (Vintar 2003), thirty-two indicators were defined, the majority of which have remained the same. In the final selection of indicators used to study the period between 2010 and 2014, a few indicators were replaced with new ones, which is why the results are not entirely comparable with those from previous studies. The indicators »life expectancy« and »average years of schooling« were replaced by »average age at death« and »share of college degree holders,« respectively, because they are no longer calculated at the level of regions as part of the aggregated human development index. In addition, the indicator referring to wastewater treatment was also replaced because the situation in this area is better illustrated by more recent data on the actual quantity of wastewater treated (as opposed to data on the capacity of the wastewater treatment plants used previously). In recent years, the indicator showing the quality of surface watercourses has proven insufficiently

sensitive because the only assessment that national monitoring still continues to use is the assessment of the chemical status (good or bad), according to which nearly all watercourses are in good chemical status, and so this indicator no longer makes it possible to monitor any differences. Therefore, this »state indicator« was replaced by the »pressure indicator« (average water consumption in households and commercial use). Due to the lack of relevant data on traffic load, the »response indicator« (the carriage by rail growth index) had to be replaced by the »pressure indicator« (the road freight transport growth index). From the methodological viewpoint, these types of adjustments in the selection of indicators are expected and recommended (Meadows 1998) because indicators must be updated in line with the changing perception of developmental issues, familiarity with how individual systems work, the availability and quality of data, and so on.

In selecting the indicators for regions, international research experience was taken into account in addition to the key criteria of conceptual and methodological quality, according to which indicators must be relevant for making decisions, understandable, measurable, sensitive to change in time and space, cost-effective, comparable, and so on (Hardi et al. 1997; Meadows 1998; Bossel 1999; Franke 1999; Seljak 2001; Morse 2004; Vintar Mally 2006; Indicators ... 2007; Hildén and Rosenström 2008; Waas et al. 2014). The selection of regional indicators of sustainable development (Table 1) is based on the content of the thematic model that has been promoted around the globe primarily by the UN (Indicators ... 2001; Indicators ... 2007), but it is also being used at the national level by the EU (Sustainable development ... 2015) and Slovenia (Suvorov, Rutar and Žitnik 2010). The final selection of indicators at the regional level is also significantly influenced by the availability of data, which is lower than at the national level.

The **economic characteristics** of Slovenian regions' development are examined based on six indicators (Table 1), whereby the focus is on the key aspects of ensuring the population's material wellbeing in terms of both the current conditions (the economic power of the region and its population, employment structure, etc.) and the efforts to build an economy that is successful and competitive in the long term (expenditure on fixed assets, R&D expenditure, etc.). Even though the intensification of economic activity and the growth in the population's purchasing power are usually connected with increasing environmental pressures (Vintar Mally 2009b; Aşici 2013; Apergis 2016), economic indicators in the selected thematic model were evaluated exclusively from the economic viewpoint because related social or environmental impacts are monitored by other indicators.

The selection of twelve **social indicators** (Table 1) was used to study the individual regions' success rate in providing a higher quality of life to their residents. The basic demographic features (population changes, population vitality, etc.), the accessibility of education and healthcare, housing conditions, utilization of human resources, and exposure to poverty and social exclusion (especially of more vulnerable groups) were examined.

The fourteen **environmental indicators** (Table 1) selected include indicators showing the environmental pressures caused by the population and economic activities (pressures caused by human settlement and the subsequent generation of waste, water consumption, and the expansion of built-up areas, pressures caused by intensive food production and livestock farming, pressures caused by road traffic, etc.), indicators showing the social responses to environmental issues (the extent of organic farming, the share of protected areas, the use of wastewater treatment and district heating, and the extent of expenditure in environmental protection), and indicators referring to the state of individual landscape components (quality of air, wooded areas).

The study was carried out for the twelve Slovenian statistical regions, in the scope and with the names they had before the 2015 changes. The calculations are based on the 2010–2014 data, which were the last data available at the time of the study. The majority of data are regularly monitored and published by the Slovenian Statistical Office (Podatkovni portal ... 2015), and data from the Records on the Actual Use of Agricultural and Forest Land (Evidenca dejanske rabe ... 2015) and data on the borders of Natura 2000 sites (Natura 2000 ... 2015) were used for indicators referring to land use and the Natura 2000 network. With regard to air quality, data provided by the Slovenian Environment Agency (Bolte et al. 2010) were used, and online audience measurement (MOSS) studies (Slovenska ... 2014) were used to determine internet use.

Indicators were calculated in three stages. First, all individual indicators were calculated and interpreted for all of the regions, after which a score was assigned to the values calculated in terms of their contribution to sustainable development. At the stage of selecting and methodologically defining individual indicators, it was clearly defined whether the highest possible value (e.g., the highest possible share of organically farmed



Table 1: Set of sustainable development indicators.

Economic indicators	Social indicators	Environmental indicators
<ul style="list-style-type: none"> <li>• Gross domestic product, 2013 [€/capita]</li> <li>• Gross value added, 2013 [€/capita]</li> <li>• Expenditure on fixed assets, 2013 [€/capita]</li> <li>• Average R&amp;D expenditure, 2010–2012 [% GDP]</li> <li>• Disposable income, 2011 [€/capita]</li> <li>• Service sector employees, 2011 [%]</li> </ul>	<ul style="list-style-type: none"> <li>• Unemployed with uncompleted or completed primary school, 2012 [%]</li> <li>• Share of unemployed women, 2014 [%]</li> <li>• Population density, 2014 [people/km<sup>2</sup>]</li> <li>• Population growth index, 2009–2014</li> <li>• Aging index, 2014</li> <li>• Average age at death, 2013 [years]</li> <li>• Recipients of social assistance benefits in cash, 2011 [no. of recipients/1,000 people]</li> <li>• Usable floor area, 2011 [m<sup>2</sup>/capita]</li> <li>• Registered unemployment rate, 2014 [%]</li> <li>• Students, 2012/2013 [no. of students/1,000 people]</li> <li>• Internet users, 2014 [index]</li> <li>• College degree holders (25–64 yrs), 2013 [%]</li> </ul>	<ul style="list-style-type: none"> <li>• Organically farmed land, 2010 [%]</li> <li>• Wooded areas, 2012 [m<sup>2</sup>/capita]</li> <li>• Road freight transport growth index, 2005–2014</li> <li>• Intensively farmed land, 2012 [m<sup>2</sup>/capita]</li> <li>• Quality of air, 2009 [assessment]</li> <li>• Municipal waste, 2013 [kg/capita]</li> <li>• Natura 2000 sites, 2013 [%]</li> <li>• Water consumption, 2013 [m<sup>3</sup>/capita]</li> <li>• Average expenditure on environmental protection, 2011–2013 [% GDP]</li> <li>• Built-up areas, 2012 [%]</li> <li>• Treated wastewater, 2013 [m<sup>3</sup>/capita]</li> <li>• Housing with district heating in place, 2011 [%]</li> <li>• Motorization rate, 2013 [cars/1,000 people]</li> <li>• Livestock density index, 2010 [LSU/ha]</li> </ul>

land) or the lowest possible value (e.g., the smallest possible share of the unemployed) of the indicator was preferred. Lower values are preferred for certain social and environmental indicators (marked with an asterisk in Tables 3 and 4). Four scores were possible for each indicator: + or ++ for a positive contribution to sustainable development in an individual area, and – or – – for a negative impact on sustainable development. For each value of the indicator attained, a score was defined for each region using the standard deviation. In the case of less than one standard deviation from the arithmetic mean, the score assigned was + or –, and for larger deviations the score was doubled (++ or – –). In the third stage, the sum of all scores for an individual development area (economic, social, and environmental) was used to calculate the average score (as the quotient of the sum of all scores and the number of indicators in an area), after which the arithmetic mean of all three areas, referred to as the indicator of sustainable regional development (ISRD), was calculated. This method makes it possible to analyze the current state of the regions and the differences between them, but it does not make it possible to also directly compare the values of the aggregate indicator in various periods because the calculation of scores is based on the regions' average in each period.

To determine the success of Slovenia's sustainable development efforts compared to other European countries, the leading international development indicators were studied. In the discussion, only the findings regarding the official selection of EU sustainable development indicators, the ecological footprint, the human development index, the environmental performance index, and the sustainable society index are highlighted.

### 3 Results

The most favorable economic conditions can be found in the Central Slovenia region, which is greatly above average in terms of all of the indicators and has the maximum average score. It is followed by the Southeast Slovenia, Gorizia, and Coastal–Karst regions, which still have distinctly positive scores. A very unfavorable economic status in Slovenia is typical especially of the Mura region (with a negative score for nearly all indicators) and the Central Sava region. The situation is slightly better, but still of concern, in the Drava and Carinthia regions (Table 2). Compared to the situation just over a decade ago (Vintar 2003), the relative situation improved the most in Southeast Slovenia (climbing from fifth to second place) and worsened the most in Upper Carniola (falling from third to sixth place). Other regions experienced minor changes in their rankings, but there are still exceptionally great economic differences between regions; the differences in the average score between the highest- and lowest-ranked regions is a full 3.17.

Table 2: Economic indicators for Slovenian statistical regions.

Indicator/Statistical region	Mura	Drava	Carinthia	Savinja	Central Sava	Lower Sava	Southeast Slovenia	Central Slovenia	Upper Carniola	Inner Carniola-Karst	Gorizia	Coastal-Karst
Gross domestic product, 2013 [€/capita] $\bar{x} = 15,360; \sigma = 3,390$	-	-	-	+	--	-	+	++	-	-	+	+
Gross value added, 2013 [€/capita] $\bar{x} = 13,274; \sigma = 2,943$	-	-	-	+	--	-	+	++	-	-	+	+
Expenditure on fixed assets, 2013 [€/capita] $\bar{x} = 1,893; \sigma = 817$	-	-	-	++	--	+	++	++	-	-	-	-
Average R&D expenditure, 2010–2012 [% GDP] $\bar{x} = 1.76; \sigma = 1.17$	-	-	-	-	-	-	++	++	+	-	+	-
Disposable income, 2011 [€/capita] $\bar{x} = 10,416; \sigma = 593$	--	--	+	-	-	-	-	++	+	+	++	+
Service sector employees, 2011 [%] $\bar{x} = 59.9; \sigma = 6.7$	-	+	--	-	+	-	-	++	+	-	-	++
Total score (sum)	-7	-5	-5	+1	-7	-4	+4	+12	0	-4	+3	+3
Average score	-1.17	-0.83	-0.83	0.17	-1.17	-0.67	0.67	2.00	0.00	-0.67	0.50	0.50
Ranking	11–12	9–10	9–10	5	11–12	7–8	2	1	6	7–8	3–4	3–4

Note:  $\bar{x}$  = arithmetic mean;  $\sigma$  = standard deviation

Table 3: Social indicators for Slovenian statistical regions.

Indicator/Statistical region	Mura	Drava	Carinthia	Savinja	Central Sava	Lower Sava	Southeast Slovenia	Central Slovenia	Upper Carniola	Inner Carniola-Karst	Gorizia	Coastal-Karst
Unemployed with uncompleted or completed primary school, 2012 [%]*, $\bar{X} = 36.3$ ; $\hat{A} = 3.9$	--	++	+	+	-	-	--	++	+	+	+	+
Share of unemployed women, 2014 [%]* $\bar{X} = 50.0$ ; $\sigma = 2.7$	--	-	--	-	+	+	-	++	+	-	++	++
Population density, 2014 [people/km <sup>2</sup> ]* $\bar{X} = 100.1$ ; $\sigma = 49.8$	+	-	+	-	--	+	+	--	+	++	++	-
Population growth index, 2009–2014, $\bar{X} = 100.4$ ; $\sigma = 2.2$	--	-	-	-	--	-	+	++	+	+	-	++
Aging index, 2014* $\bar{X} = 126.3$ ; $\sigma = 13.2$	--	-	+	+	--	-	++	++	+	+	-	-
Average age at death, 2013 [yrs] $\bar{X} = 76.1$ ; $\sigma = 0.8$	-	-	--	-	+	-	-	+	+	++	++	-
Recipients of social assistance in cash, 2011 [no. of recipients/1,000 people]*, $\bar{X} = 44.0$ ; $\sigma = 15.0$	--	--	-	-	--	-	+	++	++	+	++	+
Usable floor area, 2011 [m <sup>2</sup> /capital] $\bar{X} = 27.5$ ; $\sigma = 1.1$	+	+	-	--	--	-	-	-	+	++	++	+
Registered unemployment rate, 2014 [%]* $\bar{X} = 13.5$ ; $\sigma = 2.5$	--	-	+	-	--	-	-	+	++	+	+	+
Students, 2012/2013 [no. of students/1,000 people] $\bar{X} = 45.9$ ; $\sigma = 3.3$	-	-	+	+	-	+	++	+	+	-	++	--
Internet users, 2014 [index] $\bar{X} = 104.0$ ; $\sigma = 17.5$	+	-	++	--	++	--	+	-	+	+	--	-
College degree holders (25–64 yrs), 2013 [%] $\bar{X} = 22.5$ ; $\sigma = 3.6$	--	-	-	-	-	-	-	++	+	+	+	+
Total score (sum)	-13	-8	-1	-8	-11	-7	+1	+11	+14	+11	+11	+3
Average score	-1.08	-0.67	-0.08	-0.67	-0.92	-0.58	0.08	0.92	1.17	0.92	0.92	0.25
Ranking	12	9–10	7	9–10	11	8	6	2–4	1	2–4	2–4	5

Note:  $\bar{X}$  = arithmetic mean;  $\sigma$  = standard deviation

\*Lower indicator values mean more positive contributions to sustainable development.

Table 4: Environmental indicator for Slovenian statistical regions.

Indicator/Statistical region	Mura	Drava	Carinthia	Savinja	Central Sava	Lower Sava	Southeast Slovenia	Central Slovenia	Upper Carniola	Inner Carniola-Karst	Gorizia	Coastal-Karst
Organically farmed land, 2010 [%] $\bar{X} = 7.4; \sigma = 4.5$	--	--	+	-	+	--	+	-	-	++	+	++
Wooded areas, 2012 [m <sup>2</sup> /capita] $\bar{X} = 7,903; \sigma = 5,110$	-	-	+	-	-	-	++	-	-	++	++	-
Road freight transport growth index, 2005–2014* $\bar{X} = 102.0; \sigma = 11.3$	+	-	+	+	--	++	+	+	-	++	-	-
Intensively farmed land, 2012 [m <sup>2</sup> /capita]* $\bar{X} = 1,284; \sigma = 1,322$	--	-	+	+	+	-	-	+	+	+	+	+
Quality of air, 2009 [assessment], $\bar{X} = 10.3; \sigma = 0.4$	+	--	--	-	+	+	+	--	+	+	+	+
Municipal waste, 2013 [kg/capita]* $\bar{X} = 309; \sigma = 41$	+	-	++	+	-	-	++	--	+	+	--	--
Natura 2000 sites, 2013 [%], $\bar{X} = 37.1; \sigma = 14.9$	+	-	-	--	--	--	+	-	+	++	+	++
Water consumption, 2013 [m <sup>3</sup> /capita]* $\bar{X} = 77.3; \sigma = 23.3$	+	+	++	-	+	+	+	-	-	-	--	+
Average expenditure on environmental protection, 2011–2013 [% GDP], $\bar{X} = 0.9; \sigma = 0.7$	-	-	+	++	+	+	-	-	-	-	-	-
Built-up areas, 2012 [%]*, $\bar{X} = 5.46; \sigma = 1.82$	-	--	+	-	-	-	+	--	+	++	++	-
Treated wastewater, 2013 [m <sup>3</sup> /capita] $\bar{X} = 28.5; \sigma = 10.5$	+	+	-	+	-	-	-	++	-	-	-	++
Housing with district heating in place, 2011 [%] $\bar{X} = 11.8; \sigma = 8.1$	--	-	++	+	++	-	-	++	-	--	-	-
Motorization rate, 2013 [cars/1,000 people]* $\bar{X} = 521; \sigma = 28$	+	+	+	+	++	-	+	+	+	--	--	--
Livestock density index, 2010 [LSU/ha]* $\bar{X} = 0.83; \sigma = 0.27$	+	-	--	-	-	+	+	-	--	++	+	++
Total score (sum)	-1	-11	+7	0	0	-5	+8	-5	-3	+8	-1	+2
Average score	-0.07	-0.79	0.50	0.00	0.00	-0.36	0.57	-0.36	-0.21	0.57	-0.07	0.14
Ranking	7–8	12	3	5–6	5–6	10–11	1–2	10–11	9	1–2	7–8	4

 Note:  $\bar{X}$  = arithmetic mean;  $\sigma$  = standard deviation

\*Lower indicator values mean more positive contributions to sustainable development.

Table 5: Indicator of sustainable regional development for Slovenian statistical regions.

Average score /Statistical region	Mura	Drava	Carinthia	Savinja	Central Sava	Lower Sava	Southeast Slovenia	Central Slovenia	Upper Carniola	Inner Carniola–Karst	Gorizia	Coastal–Karst
Economic indicators	-1.17	-0.83	-0.83	0.17	-1.17	-0.67	0.67	2.00	0.00	-0.67	0.50	0.50
Social indicators	-1.08	-0.67	-0.08	-0.67	-0.92	-0.58	0.08	0.92	1.17	0.92	0.92	0.25
Environmental indicators	-0.07	-0.79	0.50	0.00	0.00	-0.36	0.57	-0.36	-0.21	0.57	-0.07	0.14
ISRD	-0.77	-0.76	-0.14	-0.17	-0.70	-0.54	0.44	0.85	0.32	0.27	0.45	0.30
Ranking	12	11	7	8	10	9	3	1	4	6	2	5

The social indicators also point to more favorable conditions in the six regions in the western half of the country (Figure 1). Upper Carniola stands out with the highest positive score, whereas the lowest average scores are characteristic of the regions in eastern Slovenia, which are primarily burdened by a poorer educational structure, higher unemployment rate, shorter life expectancy (judging from the age at death), greater exposure to poverty and social exclusion, and subsequently stagnation or even decline of the population alongside an above-average aging index. The social differences between Slovenian regions are smaller than the economic ones, but they are nonetheless significant considering that the difference in scores is a full 2.25. Over the past decade, the relative situation of the Lower Sava region has improved the most, having moved up from last place, which it shared with the Central Sava region. The situation deteriorated the most in the Mura region, which fell from tenth to last place (Vintar 2003). Changes in the rankings of other regions were smaller and some have retained their rank (e.g., Upper Carniola has remained in the lead).

With regard to environmental indicators, the positive or negative scores are distributed more evenly across the entire county, which is also reflected in the regions' final rankings. In contrast to the economic and social areas, here no east-west division can be observed (Table 4). The most favorable conditions can be found in the Southeast Slovenia and Inner Carniola–Karst regions, followed by Carinthia. The lowest scores compared to this are typical for the Drava region, followed by the Central Slovenia and Lower Sava regions at the bottom of the scale. Over the past decade, the greatest differences in the rankings of individual regions have been observed in this area. The greatest decline was experienced by the Gorizia region (falling from first to seventh/eighth place) and the Upper Carniola region (falling from second/fourth place to ninth), whereas the Mura region experienced the greatest improvement (moving up from last place to seventh/eighth place). The difference between regions is also the smallest in this development area (i.e., 1.36).

From 2010 to 2014, the indicator of sustainable regional development ranged from +0.85 (Central Slovenia) to -0.77 (Mura), which reflects great differences between the regions in all development areas (Table 5). The ISRD values show a distinctly bipolar picture: the regions in the eastern half of Slovenia have a negative value and the six regions in the western part of the country have a positive value. The regions' relative situation over the past decade (Vintar 2003) has not changed significantly. The greatest changes can be observed in Southeast Slovenia (climbing from fifth to third place) and Upper Carniola (falling from second to fourth place).

## 4 Discussion

### 4.1 Regional development differences in Slovenia

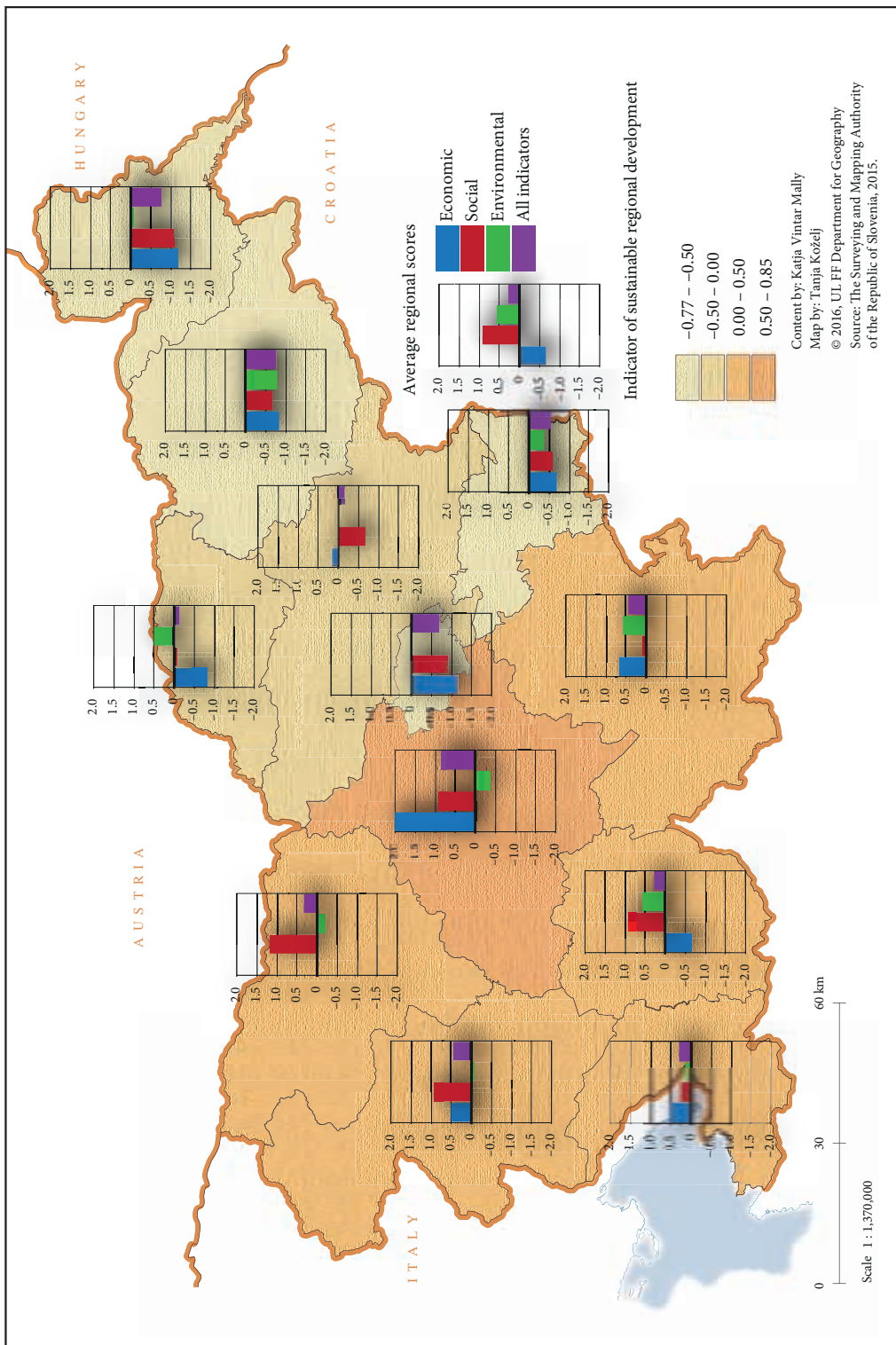
Every Slovenian region has its own unique range of development potentials, but also obstacles to achieving a sustainable development path, which by definition requires seeking opportunities for socioeconomic progress within the existing environmental limitations or by taking into account the carrying capacity of the environment (Moran et al. 2008; Kissinger, Rees and Timmer 2011; Moldan, Janoušková and Hák 2012; Hoekstra and Wiedmann 2014). A preserved natural environment represents an important regional potential, whereas a degraded environment is a limiting factor that reduces residents' quality of life and economic opportunities. Based on the premises described, Slovenian regions can be ranked into four types by similarity and the following two criteria: the combination of (negative or positive) average scores of individual development areas on the one hand, and the regions' ISRD values on the other (Figure 2).

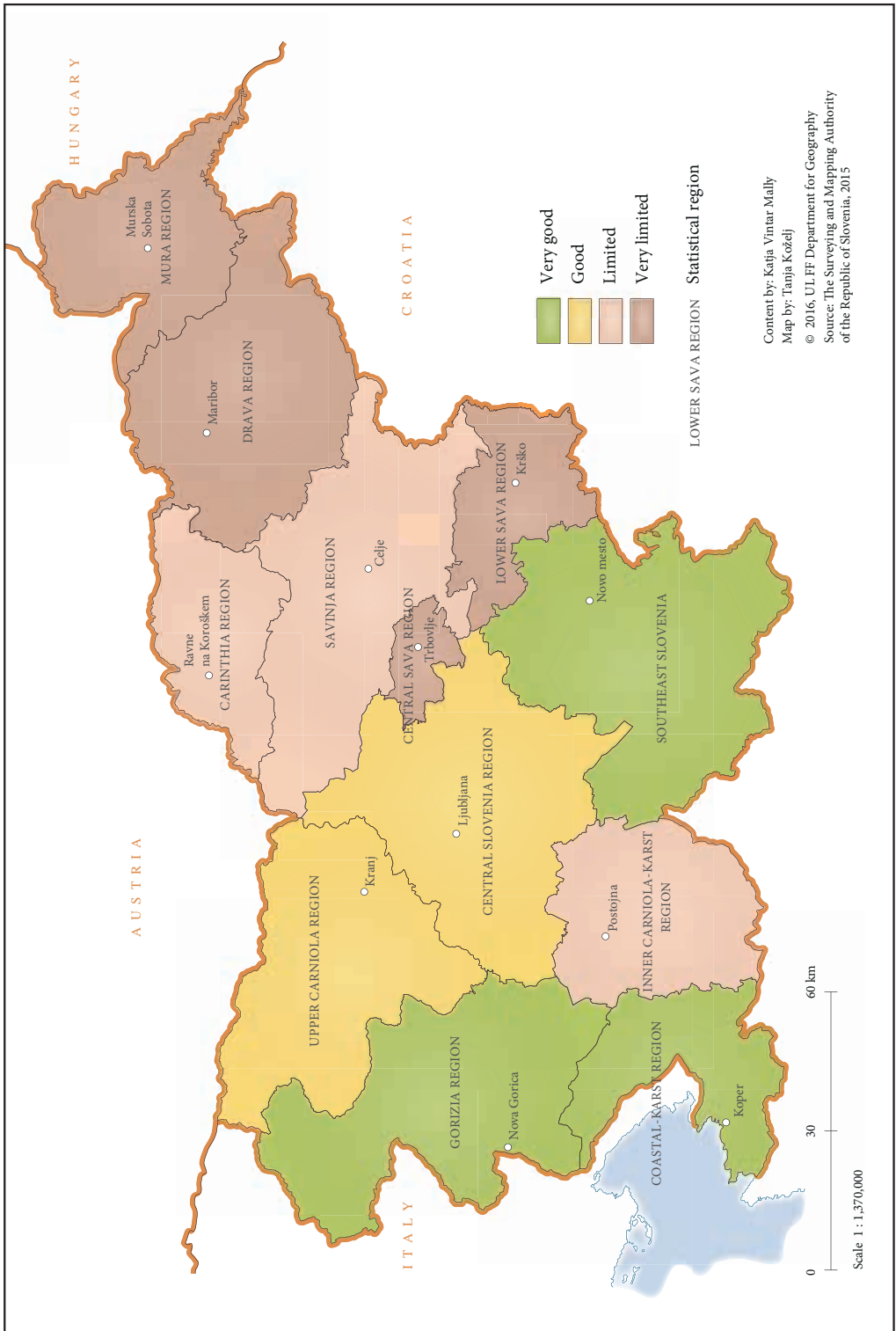
In terms of the indicators studied, the Mura, Drava, Central Sava, and Lower Sava regions have very limited opportunities for achieving sustainable development because they do not have a positive average score in any of the development areas and consequently show a high negative ISRD value (between -0.77 and -0.54). It will be extremely difficult for these regions to achieve a balanced and significant improvement in all three development areas. Better, but still limited, opportunities can be ascribed to the Carinthia, Savinja, and Inner Carniola–Karst regions, the ISRD value of which ranges from -0.17 to +0.27 and the economy of which still lags behind considerably. In this regard, the exception is the Savinja region, which only achieved a slightly above-average score of the economic indicators in the last period studied,

Figure 1: Indicator of sustainable regional development of Slovenian statistical regions, 2010–2014. ► p. 41

Figure 2: Synthesized assessment of opportunities for sustainable development realization in Slovenian regions. ► p. 42







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 Map by: Tanja Koželj  
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 of the Republic of Slovenia, 2015

whereas it continues to lag behind greatly in the social area, which raises considerable concern. For now, the environmental conditions are favorable in all three regions, but they run the risk that by continuing their predominant development practices they might try to accelerate their economy by degrading the environment. Central Slovenia and Upper Carniola were ranked among the type of regions with good development opportunities. They have a distinctly positive ISRD value, which is, however, largely due to above-average socioeconomic scores (Central Slovenia has the highest economic indicator score and Upper Carniola has the highest social indicator score). At the same time, their environmental scores are negative, which suggests that the current progress is largely being achieved to the detriment of the environment, which has a negative impact on their long-term development opportunities.

The opportunities for achieving sustainable development are very good in the Southeast Slovenia, Gorizia, and Coastal-Karst regions, which have a positive ISRD value and positive average scores in all the development areas studied. A minor exception can only be observed with the Gorizia region, which achieved a slightly below-average environmental indicator score only in the last period studied.

Several studies of Slovenian regions have been conducted in the past that used various sets of indicators and evaluated their development potentials from various angles, such as the state of environmental quality in relation to the GDP (Plut 2005), development factors of a knowledge society (Ravbar and Kozina 2012), or vulnerability to future development challenges (Kušar 2015). The government uses the development risk index to monitor regional development (Pravilnik o razvrstitvi ... 2014). Even though these studies differ from one another in terms of methodology and the topics covered, the comparison of their findings shows that they all established differences between regions. As a rule, the regions in western Slovenia are ranked higher, and most often the leading role (i.e., the best point of departure) is assumed by Central Slovenia and the Mura region is in last place. The regions' rankings according to the ISRD and the development risk index match considerably, with the majority of regions differing by only one or two places. However, because the environmental aspects in the ISRD have significantly greater weight compared to the development risk index, the Gorizia and Inner Carniola-Karst regions are ranked four places higher according to the ISRD.

## 4.2 (Non-)sustainable development of Slovenia and Europe

Many authors and international organizations draw attention to both global and regional non-sustainable trends, which are reflected in exceeded carrying capacity of the planet and its regions (Millennium Ecosystem ... 2005; Hoekstra and Wiedmann 2014; Shaker 2015; The European environment ... 2015; Steffen et al. 2015). Thus in the light of global processes it is necessary, regardless of everything described above on Slovenian regions, to draw attention to the fact that for now redirecting to a sustainable development path is successful neither in Slovenia nor in Europe or elsewhere around the globe.

The study of over one hundred sustainable development indicators officially selected by the EU (Sustainable development ... 2015) shows only partial success in the member states; positive changes can be observed especially with regard to economic and social issues (with the exception of exposure to poverty and social exclusion), whereas environmental trends prove to be unfavorable in the long term, especially due to the unsustainable use of energy and natural resources, and traffic pressures. Similarly, the calculations of the international sustainable society index (de Kerk, Manuel and Kleinjans 2014), which include twenty-one social, economic, and environmental indicators, point to opposing trends of human wellbeing and environmental wellbeing: while the former increases, the latter decreases. According to this index, among the 151 countries included, Slovenia was ranked tenth in 2014 in terms of economic wellbeing and fifteenth in terms of human wellbeing. However, in terms of environmental wellbeing it only placed ninety-third. The comparatively low values of the wellbeing of the Slovenian environment (and other economically developed countries) are primarily due to the great weight ascribed in the calculations to indicators referring to the use of energy and related environmental pressures (de Kerk and Manuel 2008; de Kerk, Manuel and Kleinjans 2014).

The calculations of the ecological footprint also illustratively draw attention to the exceeded carrying capacities or biocapacity caused by the human demand for natural resources (Kissinger, Rees and Timmer 2011; Shaker 2015; Galli et al. 2016). According to calculations by the Global Footprint Network (2016), in 2012 the ecological footprint per capita in the EU amounted to 4.8 global hectares (gha), exceeding the planet's biocapacity (1.7 gha per capita) by a factor of 2.8. At 5.8 gha per capita, Slovenia's ecological footprint

exceeded the national biocapacity (2.4 gha per capita) by a factor of 2.4 and the global biocapacity by a factor of 3.4. Among all of the EU member states, the average Slovenian resident had the ninth-largest ecological footprint (after Luxembourg, Belgium, Sweden, Estonia, Latvia, Austria, Finland, and Lithuania). Over the past two decades, Slovenia's ecological footprint has nearly doubled and its continual growth in recent years has been (probably only temporarily and in part) interrupted by the effects of the global financial crisis. This crisis was also reflected in the stagnation or exceptionally slow growth of the human development index as an aggregate indicator of the general socioeconomic conditions in the country. According to this index, Slovenia was twenty-fifth (0.880) in the world and twelfth in the EU in 2014 (Human development ... 2015). Alongside a smaller ecological footprint, many European countries thus displayed better economic and social conditions (e.g., Denmark, the Netherlands, Germany, and the UK). Studies carried out as part of calculating the environmental performance index (Hsu et al. 2016), according to which Slovenia has the fifth-most favorable index in the world (after Finland, Iceland, Sweden, and Denmark), also confirm a comparatively extremely high consumption of natural resources (especially fuels) in Slovenia and its regions, whereas the state of its environment is still relatively good. This index combines more than twenty different indicators referring to the ecosystem and human health (Hsu, Lloyd and Emerson 2013; Hsu et al. 2016) and, at least from the viewpoint of Slovenian environmental protection efforts, its results are encouraging.

## 5 Conclusion

The economic, social, and environmental analysis of the development pattern from the viewpoint of sustainable development requirements revealed many advantages as well as weaknesses of Slovenian regions, providing valuable information required for transforming or shaping sectoral and horizontal policies at the regional and national levels. The finding that the great differences between regions continue to divide the country into the more successful western part and the eastern part, which lags behind, is especially important. In addition, comparisons of the relative positions of regions in individual periods from the beginning of the twenty-first century show great variability in the inter-regional ratios from the environmental viewpoint, whereas they seem to be fixed the most and most difficult to influence from the economic and social viewpoints. The average scores for individual development areas confirm the validity of the hypothesis that the differences between Slovenian regions continue to be the greatest with regard to economic issues and the smallest with regard to environmental issues. The starting point for evaluating the long-term sustainable development opportunities of individual regions and Slovenia and other (European) countries is the thesis about the unacceptability of a development pattern that achieves economic progress by depleting the environmental and social capital, which especially the economically weakest areas will have to pay attention to in the future. In this regard, the trend of Slovenia's increasing environmental pressures (e.g., its ecological footprint) and its disproportionately high interference with the planet's carrying capacities or its disproportionate use of natural resources compared to Europe and the rest of the world are distinctly unfavorable. Despite improvements made to material and social wellbeing, the unfavorable environmental trends mean that Slovenia and other EU countries are drifting further away from the objectives of sustainable development. However, Slovenia has the advantage of an environment that is still relatively well preserved.

## 6 References

- Agenda 21. Programme of action for sustainable development, Rio declaration on environment and development. The United Nations Conference on Environment and Development. Rio de Janeiro, 1992.
- Apergis, N. 2016: Environmental Kuznets curves: New evidence on both panel and country-level CO<sub>2</sub> emissions. *Energy Economics* 54. DOI: <http://dx.doi.org/10.1016/j.eneco.2015.12.007>
- Aşici, A. A. 2013: Economic growth and its impact on environment: A panel data analysis. *Ecological Indicators* 24. DOI: <http://dx.doi.org/10.1016/j.ecolind.2012.06.019>
- A sustainable Europe for a better world: A European Union strategy for sustainable development. Commission of the European Communities. Brussels, 2001.

- Bolte, T., Gjerek, M., Šegula, A., Koleša, T., Murovec, M., Lešnik, M., Turk, D., Rode, B., Komar, Z. 2010: Ocena onesnaženosti zraka z žveplovim dioksidom, dušikovimi oksidi, delci PM<sub>10</sub>, ogljikovim monoksidom, benzenom, težkimi kovinami (Pb, As, Cd, Ni) in policikličnimi aromatskimi ogljikovodiki (PAH) v Sloveniji za obdobje 2000–2009. Ljubljana.
- Bossel, H. 1999: Indicators for sustainable development: theory, method, applications, A Report to Balaton Group. Winnipeg.
- Dahl, A. L. 2012: Achievements and gaps in indicators of sustainability. *Ecological Indicators* 17. DOI: <http://dx.doi.org/10.1016/j.ecolind.2011.04.032>
- Europe 2020, Strategy for smart, sustainable and inclusive growth. European Commission. Brussels, 2010.
- Evidenca dejanske rabe kmetijskih in gozdnih zemljišč. Podatkovna zbirka za leto 2012. MKGP – Ministrstvo za kmetijstvo, gozdarstvo in prehrano. Internet: <http://rkg.gov.si/GERK/> (27. 8. 2015).
- Franke, W. 1999: Indikatoren zur Messung einer nachhaltigen Entwicklung auf Landesebene. Indikatorensysteme für eine nachhaltige Entwicklung in Kommunen. Berlin.
- Galli, A., Giampietro, M., Goldfinger, S., Lazarus, E., Lin, D., Saltelli, A., Wackernagel, M., Müller, F. 2016. Questioning the ecological footprint. *Ecological Indicators* 69. DOI: <http://dx.doi.org/10.1016/j.ecolind.2016.04.014>
- Global Footprint Network. National Footprint Accounts, 2016.
- Hak, T., Kovanda, J., Weinzettel, J. 2012: A method to assess the relevance of sustainability indicators: Application to the indicator set of the Czech Republic's sustainable development strategy. *Ecological Indicators* 17. DOI: <http://dx.doi.org/10.1016/j.ecolind.2011.04.034>
- Hardi, P., Barg, S., Hodge, T., Pinter, L. 1997: Measuring sustainable development, Review of current practice. Ottawa.
- Hildén, M., Rosenström, U. 2008: The use of indicators for sustainable development. *Sustainable Development* 16. DOI: <http://dx.doi.org/10.1002/sd.375>
- Hoekstra, A. Y., Wiedmann, T. O. 2014: Humanity's unsustainable environmental footprint. *Science* 344-6188. DOI: <http://dx.doi.org/10.1126/science.1248365>
- Hsu, A., Lloyd, A., Emerson, J. W. 2013: What progress have we made since Rio? Results from the 2012 Environmental Performance Index (EPI) and Pilot Trend EPI. *Environmental Science & Policy* 33. DOI: <http://dx.doi.org/10.1016/j.envsci.2013.05.011>
- Hsu, A. (ed.). 2016: Environmental performance index. New Haven.
- Human development report 2015. United Nations Development Programme. New York, 2015.
- Indicators of sustainable development, guidelines and methodologies. United Nations Commission on Sustainable Development. New York, 2001.
- Indicators of sustainable development, guidelines and methodologies. United Nations. New York, 2007.
- Kazalniki blaginje v Sloveniji, 2015. Internet: <http://www.kazalniki-blaginje.gov.si/> (15. 9. 2015).
- de Kerk, G. V., Manuel, A. R. 2008: A comprehensive index for a sustainable society: The SSI – the sustainable society index. *Ecological Economics* 66, 2–3. DOI: <http://dx.doi.org/10.1016/j.ecolecon.2008.01.029>
- de Kerk, G. V., Manuel, A., Kleinjans, R. 2014: Sustainable Society Index SSI-2014. Hague.
- Kissinger, M., Rees, W. E., Timmer, V. 2011: Interregional sustainability: governance and policy in an ecologically interdependent world. *Environmental Science & Policy* 14-8. DOI: <http://dx.doi.org/10.1016/j.envsci.2011.05.007>
- Kušar, S. 2015: Ranljivost za prihodnje razvojne izzive – poskus primerjalne analize razvojnih regij v Sloveniji. Regionalni razvoj 5. Ljubljana.
- Meadows, D. 1998: Indicators and information systems for sustainable development, A report to the Balaton Group. Vermont.
- Millennium Ecosystem Assessment, 2005. Ecosystems and human well-being: Synthesis. Washington.
- Moldan, B., Janoušková, S., Hák, T. 2012: How to understand and measure sustainability: Indicators and targets. *Ecological Indicators* 17. DOI: <http://dx.doi.org/10.1016/j.ecolind.2011.04.033>
- Morse, S. 2004: Indices and indicators in development, An unhealthy obsession with numbers? London.
- Moran, D. D., Wackernagel, M., Kitzes, J. A., Goldfinger, S. H., Boutad, A. 2008: Measuring sustainable development – Nation by nation. *Ecological Economics* 64-3. DOI: <http://dx.doi.org/10.1016/j.ecolecon.2007.08.017>



- Natura 2000 – Seznam zbirke prostorskih podatkov. ARSO – Agencija Republike Slovenije za okolje. Internet: [http://gis.arso.gov.si/wfs\\_web/faces/WFSLayersList.jspx](http://gis.arso.gov.si/wfs_web/faces/WFSLayersList.jspx) (29. 7. 2015).
- Plut, D. 2005: Sonaravna zasnova regionalnega razvoja Slovenije. Dela 24. DOI: <http://dx.doi.org/10.4312/dela.24.8.99-111>
- Podatkovni portal SI STAT. SURS – Statistični urad Republike Slovenije, 2015 Internet: <http://pxweb.stat.si/pxweb/Dialog/statfile2.asp> (27. 8. 2015).
- Poročilo o razvoju 2015. Urad Republike Slovenije za makroekonomske analize in razvoj. Ljubljana, 2015.
- Pravilnik o razvrstitvi razvojnih regij po stopnji razvitosti za programsko obdobje 2014–2020. Uradni list Republike Slovenije 34/2014. Ljubljana.
- Ravbar, M., Kozina, J. 2012: Geografski pogledi na družbo znanja v Sloveniji. Georitem 19. Ljubljana.
- Renewed EU sustainable development strategy. Council of the European Union. Brussels, 2006.
- Rinne, J., Lyytimäki, J., Kautto, P. 2013. From sustainability to well-being: Lessons learned from the use of sustainable development indicators at national and EU level. *Ecological Indicators* 35. DOI: <http://dx.doi.org/10.1016/j.ecolind.2012.09.023>
- Seljak, J. 2001: Kazalec uravnoteženega razvoja. Ljubljana.
- Shaker, R. R. 2015: The spatial distribution of development in Europe and its underlying sustainability correlations. *Applied Geography* 63. DOI: <http://dx.doi.org/10.1016/j.apgeog.2015.07.009>
- Slovenska oglaševalska zbornica. MOSS, 2014. Več kot četrtnina slovenskih spletnih uporabnikov je iz osrednje-slovenske regije. Internet: <http://www.moss-soz.si/si/novice/12502/detail.html> (10. 8. 2015).
- Steffen, W., Richardson, K., Rockström, J., Cornell, S. E., Fetzer, I., Bennett, E. M., Biggs, R., Carpenter, S. R., de Vries, W., de Wit, C. A., Folke, C., Gerten, D., Heinke, J., Mace, G. M., Persson, L. M., Ramanathan, V., Reyers, B., Sörlin, S. 2015: Planetary boundaries: Guiding human development on a changing planet. *Science* 347-6223. DOI: <http://dx.doi.org/10.1126/science.1259855>
- Strategija razvoja Slovenije. Urad Republike Slovenije za makroekonomske analize in razvoj. Ljubljana, 2005.
- Sustainable development in the European Union: 2015 monitoring report of the EU Sustainable Development Strategy. Publications Office of the European Union. Luxembourg, 2015.
- Suvorov, M., Rutar, T., Žitnik, M. 2010: Kazalniki trajnostnega razvoja za Slovenijo. Ljubljana.
- The European environment – state and outlook 2015: synthesis report. European Environment Agency. Copenhagen, 2015.
- van Hees, S. E. W. 2014: Sustainable development in the EU: Redefining and operationalizing the concept. *Utrecht Law Review* 10-2. DOI: <http://dx.doi.org/10.18352/ulr.269>
- Vintar, K. 2003: Okoljevarstveni vidiki sonaravnega regionalnega razvoja Slovenije. Magistrsko delo, Oddelek za geografijo Filozofske fakultete Univerze v Ljubljani. Ljubljana.
- Vintar Mally, K. 2006: Prednosti in omejitve uporabe kazalcev sonaravnega razvoja. Dela 26. DOI: <http://dx.doi.org/10.4312/dela.26.4.43-59>
- Vintar Mally, K. 2009a: (Ne)sonaravnost razvoja slovenskih regij. Razvojni izzivi Slovenije. Ljubljana.
- Vintar Mally, K. 2009b: Balancing socio-economic development and environmental pressures: Mission impossible? *Moravian Geographical Reports* 17-1.
- Waas, T., Hugé, J., Block, T., Wright, T., Benitez-Capistros, F., Verbruggen, A. 2014: Sustainability assessment and indicators: tools in a decision-making strategy for sustainable development. *Sustainability* 6-9. DOI: <http://dx.doi.org/10.3390/su6095512>