

Abstract: Considering the settlement pattern in Slovenia, small towns with a population of 5,000 to 15,000 are very important for balanced regional and local development, especially for the achievement of sustainable development goals. This paper presents findings from a study of the level of sustainability in 32 Slovenian small towns, as assessed using a set of twelve economic, social, and environmental indicators of sustainable development. A comparison of the results for the years 2002 and 2018 shows that over the past two decades, Slovenian small towns have for the most part successfully advanced towards the goals of sustainable development. The small towns that lag behind in these efforts were identified, as were the development areas where sustainability trends are less favorable.

Keywords: small towns, sustainable development, sustainable development indicators, rural areas, Slovenia

Izvleček: Glede na poselitveni vzorec v Sloveniji so mala mesta, ki imajo od 5000 do 15.000 prebivalcev, zelo pomembna za skladnejši regionalni in lokalni razvoj, zlasti še za doseganje ciljev trajnostnega razvoja. V prispevku so predstavljeni rezultati preučitve stopnje trajnosti v 32 slovenskih malih mestih, ki smo jo ocenili z uporabo nabora dvanajstih ekonomskih, socialnih in okoljskih kazalnikov trajnostnega razvoja. Primerjava rezultatov za leti 2002 in 2018 kaže, da so se slovenska mala mesta v zadnjih dveh desetletjih večinoma uspešno približevala ciljem trajnostnega razvoja, ob tem pa smo prepoznali tako mala mesta, ki v teh prizadevanjih zaostajajo, kot tudi razvojna področja, na katerih so trendi z vidika trajnosti neugodni.

Ključne besede: mala mesta, trajnostni razvoj, kazalniki trajnostnega razvoja, podeželje, Slovenija

Highlights

- The role of small towns in the Slovenian urban system and sustainable development.
 - Calculation of the level of economic, social, and environmental sustainability of small towns in Slovenia.
 - Comparison of the levels of sustainability of Slovenian small towns in 2002 and 2018.
 - Small towns show favorable trends in approaching the goals of sustainable development.
 - Differences in the achievement of goals are the biggest in the economic sphere and smallest in the environmental sphere.
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1. Introduction

Even as rapid urbanization is taking place throughout the world, the level of urbanization in Slovenia has remained at around 50% since the 1980s, and is among the lowest in the European Union (Ministry of the Environment and Spatial Planning, 2016). According to the criteria of the Statistical Office of the Republic of Slovenia (SURS, 2021), there are 104 urban settlements in the country, in which a total of 1,001,056 people, or 47.8% of the total population, resided in 2020. In Slovenia, which is characterized by scattered settlement with a relatively low population density, there are around 6,000 settlements of various sizes. These are scattered throughout the country and have small populations: 96% of all settlements have fewer than 1,000 inhabitants and 48% of settlements even fewer than 100 inhabitants (Ministry of the Environment and Spatial Planning, 2016; SURS, 2021). The established network of small and medium-sized towns in Slovenia represents a framework for achieving the goals of sustainable polycentric spatial (urban) development at all levels (Zavodnik Lamovšek et al., 2008; Drobne et al., 2014). The urban system in Slovenia is the result of polycentric regional and urban planning policies dating from

the 1970s and 1980s, which fostered the development of jobs (especially in industry) and services in many smaller towns across the country and daily commuting by rural residents to centers of employment. This slowed rural-urban migration, and the settlement pattern has not noticeably changed even in recent decades (Rebernik, 2005), when much of the economy underwent major restructuring. This is also reflected at the regional level, as according to the latest typology, used by Eurostat and based on the share of rural population, preponderantly rural regions (eight statistical regions) continue to predominate in Slovenia, three are classified as so-called intermediate regions and only the Obalno-kraška Statistical Region is predominantly urban (Eurostat, 2020).

Over the past three decades, achieving sustainable development at various spatial levels, including at the level of towns and settlements, has become imperative. Among the latest efforts for sustainable urban development at the international level is Agenda 2030: in the eleventh of its seventeen sustainable development goals, it highlights the need to “make cities and human settlements inclusive, safe, resilient and sustainable” (UN, 2015). This goal was also the starting point for the United Nations Conference on Housing and Sustainable Urban Development (Habitat III), which adopted the New Urban Agenda (UN, 2017) with the aim of promoting sustainable urban development. Slovenia reaffirmed its commitment to sustainable development in the Slovenian Development Strategy 2030 (Government Office for Development and European Cohesion Policy, 2017). The central goal of this umbrella document on development is to ensure a high quality of life for all the country's inhabitants, which “can be achieved through balanced economic, social and environmental development that takes account of the planet's limitations and creates conditions and opportunities for present and future generations. At the level of the individual, a high quality of life is manifested in good opportunities for employment, education and creativity, in a dignified, safe and active life, a healthy and clean environment and inclusion in democratic decision-making and participation in social management.” (Government Office for Development and European Cohesion Policy, 2017, p. 17).

The goals set in the Slovenian Development Strategy 2030 concern urban and rural areas equally and are closely related to the goals of sustainable development of the United Nations, while taking into account the specific development features of Slovenia. For this study, we focused on small towns in assessing the achievement of sustainable development goals, since in Slovenia, these are important for balanced regional and local development, particularly in providing jobs and a range of services for the population of their rural hinterlands. Implementing sustainable development in small towns and elsewhere is not just about focusing on environmental aspects (such as clean water, unpolluted air, efficient waste management or the management of protected areas), but rather about combining environmental, economic, social and cultural aspects and objectives (Mainet, 2015). These various forces acting on a system must be in balance for the system to be sustainable (Babu, Datta, 2015). On the other hand, unsustainable practices in small towns are reflected in economic decline, job losses, segregation, exclusion, environmental degradation, lower recognition, declining overall quality of life, and ultimately in population loss (Knox & Mayer, 2013; Mainet, 2015).

Small towns play a central role in the settlement network and as a rule represent the centers of the economic, social, cultural and administrative life of their rural hinterlands (Špes, 2008; Zavodnik Lamovšek et al., 2008). They provide rural residents with services, jobs, opportunities for socializing, short trips, arranging certain administrative matters, and moreover the basis for their (micro) regional identity (Vaishar & Zapletalová, 2009; Vaishar et al., 2015). Small towns thus play an important role in promoting and guiding rural development, which is particularly important for achieving balanced regional and sustainable development. Vaishar, Zapletalová and Novaková (2016) defined small towns, from a rural perspective, as development poles and also prepared a comprehensive overview of research on small towns in Europe. In contrast to larger towns and cities, small towns are generally more sustainable, especially due to less traffic congestion, pollution, and crime, as well as due to their closer proximity to nature (Visvaldis et al., 2013; Mainet, 2015). Extensive opinion polls within the multi-year project *Competitiveness of small towns in the Czech Republic* also showed that the population favors living in small towns, which they describe as “pleasantly small” and “attractive for living” (Ježek, 2011). In studying the revitalization of small towns (in the United States), Robertson (2001) also found that compared to bigger cities they are better adapted, organized on a human scale, and perceived as safer. It should be

noted that we are dealing with generalizations here, while in regions and countries we find small towns with diverse development conditions and challenges. On the other hand, the results of achieving or not achieving the goals of sustainable development can also be interpreted in the context of (urban) resilience. In urban space, we understand resilience as the ability to adapt to ever new (changing) environmental, spatial, economic and social conditions (Pichler-Milanović et al., 2014). By monitoring the achievement of sustainable development goals and integrating current results into the planning process, we can contribute to the resilience of towns and their ability to respond to environmental and spatial changes.

In the context of achieving the above-mentioned national and international goals of sustainable development, we decided to repeat a study on the sustainable development of small towns that we conducted fifteen years ago in collaboration with Czech colleagues (Cigale et al., 2006; Lampič & Špes, 2007; Špes, 2008). In that study, we identified types of small towns in Moravia and Slovenia, developed a set of twelve economic, social, and environmental indicators of sustainable development adapted for the analysis of small towns, and established a method for standardizing results. In this repeat survey for Slovenian small towns, we retained all of the above and performed only some necessary updates of indicators based on available data or changes in the manner of their collection. Included in the study were all Slovenian towns with a population of 5,000 to 15,000 (Figure 1). The ceiling for the size of small towns was already set at 15,000 inhabitants in the original study, as these represent regional centers within the Slovenian urban system, whose functions and area of influence differ significantly from smaller towns. Conversely, towns with fewer than 5,000 inhabitants, which are extremely numerous in Slovenia, have limited roles as employment and service centers (Cigale et al., 2006; Lampič et al., 2007). In 2018, there were only eight towns in Slovenia with more than 15,000 inhabitants (Ljubljana, Maribor, Celje, Kranj, Koper, Velenje, Novo Mesto and Ptuj), with a total of a quarter of the country's population. These were followed by 32 towns with 5,000 to 15,000 inhabitants, which we defined as small towns in our study (Table 1).

In the period 2002–2018, the total number of inhabitants in the group of small towns did not change significantly (growth index 101.9), but particular small towns experienced highly varying population trends: thirteen recorded a decrease in population (the greatest in Trbovlje, by 16%), while the rest increased in population (the greatest in Grosuplje, by 25%) (Table 3). While 32 settlements met the criteria for small towns in 2018, only 26 of these were included in the 2002 survey: in four small towns in the period 2002–2018, the population increased and exceeded the lower limit of 5,000 (Medvode, Rogaška Slatina, Sežana and Slovenske Konjice), and in two towns (Trbovlje and Nova Gorica), the population dropped below the upper limit of 15,000. As the number of inhabitants in most small towns fluctuates from year to year, the smaller ones may have slipped below the lower limit of 5,000 inhabitants in some of the years of our study period (such as Bled and Rogaška Slatina), but they were not excluded from the study.

Tab 1. Urban settlements with 5,000 to 15,000 inhabitants in Slovenia, 2002–2018. Source: SURS, 2021.

	2002	2018
Number of settlements	26*	32
Number of inhabitants	258,625	263,629
Share of all inhabitants in the country (%)	12.97	12.76

Note: *In both years, Lucija and Portorož were considered as one small urban agglomeration (i.e., a small town), although officially, they were two separate settlements.



Fig 1. Small towns in the urban system of Slovenia included in the study. Source: SURS, 2021

By repeating the above-mentioned study for 2018 and comparatively analyzing the results for 2002 and 2018, we aimed to determine the extent to which Slovenian small towns have moved away from or closer to the goals of sustainable development in the period 2002–2018. Representative indicators were used for each of the three areas of sustainable development (economic, social and environmental) and assessed according to the goals of each area. Through the study, we also sought to identify small towns that are above or below the average in achieving the goals of sustainable development and to compare their achievements in the two years studied. We began the investigation with the assumption that small towns in Slovenia in general are approaching the goals of sustainable development, but the relative position in the achieved level of sustainability in most small towns varies depending on the economic, social, and environmental conditions in them and in the country.

2. Methods

The investigation of the levels of sustainability achieved in the development of small towns was based on the application of sustainable development indicators enabling a comprehensive view of the functioning of the urban system. The set of selected indicators was already adapted in the first study (Cigale et al., 2006; Lampič & Špes, 2007) to the specific features of small towns as well as to the availability of data at the spatial level selected. Twelve indicators were included in the final set, i.e., four indicators for each of the three areas of sustainable development (Table 2), thus meeting the requirement of equal weighting of the social, economic and environmental dimensions of development within a common framework. The selected individual indicators do not cover all aspects of the development fields, but are representative of them in the absence of more synthetic indicators (Vintar Mally, 2007). International methodological recommendations were taken into account in designing the set of indicators both in the original study and in its repetition (Hardi et al., 1997; Meadows, 1998; Bossel, 1999; Franke, 1999; Seljak, 2000; Morse, 2004; Vintar Mally, 2006; UN, 2007; Hildén & Rosenström, 2008; Waas et al., 2014), but it should be noted that the final set of indicators is nevertheless always dependent on the availability of data and in our case, also on the assessment of the international expert group that defined

the indicators in the original study. In repeating the study, we used the same set of indicators, but due to improvements in statistics and the situation in the environmental field, we partially changed the calculation of the indicator for waste management and wastewater treatment, and in the economic field due to the unavailability of data, we used the price of an existing dwelling in place of the cost of building land in 2018. The changes in the indicators partially prevent a direct comparison of the results between the two periods studied, just as it is limited by some methodological changes in the collection of statistical data. However, since the data for each indicator in a particular period are collected and recalculated in the same way for all the Slovenian small towns included, comparisons among towns are nevertheless entirely justifiable.

Each indicator included has a well-defined source of data and method of calculation, and was selected to illustrate a specific aspect of the implementation of sustainable development in small towns. For each of the 32 small towns in Slovenia, we calculated the selected indicators for 2018 or the most recent period with available data. We chose 2018 for the calculation because it was the last year at the time of the survey with available data for most indicators. Statistical data for most indicators are monitored and published by the Slovenian Statistical Office (SURS, 2021), data on the registered unemployment rate by the Employment Service of Slovenia (ZRSZ, 2021), data on the average personal income tax base by the Ministry of Finance (MF, 2021), on land use for the calculation of ecological stability by the Ministry of Agriculture, Forestry and Food (MGKP, 2021), on real estate prices by the Surveying and Mapping Authority of the Republic of Slovenia (GURS, 2019), while records on educational institutions, health care institutions and nursing homes are kept by the ministries responsible (MDDSZ, 2021; MIZŠ, 2021; MZ, 2021). The calculation of indicators and interpretation of their content was followed by classification into classes, with four classes formed for each indicator according to the range of data.

For most indicators, we used the value of the arithmetic mean (obtained from the values of all small towns included) for the boundary between the second and third class, and the value of one standard deviation from the arithmetic mean for the boundary between the first and second and the third and fourth classes. Only for two indicators were the classes defined differently, for air quality (based on an expert assessment of the self-cleaning capacity of the air and sources of pollution in the town) and for accessibility of social services (i.e., secondary school, nursing home, and hospital) in the town. Towns that have the most favorable position from the point of view of sustainable development in the area investigated were thus always ranked in the first class (Table 3), while those with the least favorable values were ranked in the fourth class. This classification enabled the further calculation of the average class of towns in the environmental, social and economic fields, and consequently also a comparison of towns with one another.

According to the average value of classes in each individual development area, small towns were classified into three groups: those with an above-average level (lower than 2.0), those with an average level (2.0–2.9) and those with a below-average level (3.0 and higher) of economic, social, or environmental sustainability. Following the same principle, in the last step, we also determined the level of sustainability achieved for all three areas taken together. Classification into classes and groups also made it possible to compare small towns between the two periods studied and to identify general trends in their progress or lack thereof.

Tab 2. The set of economic, social and environmental indicators used for the development analysis of small towns.
Sources: Cigale et al., 2006; Vintar Mally, 2007; own calculations

No.	Name of the indicator	Definition of the indicator	Rationale for the indicator from the sustainability viewpoint	Arithmetic mean and standard deviation, 2018
Economic indicators				
1	Gross income	Gross income as a basis for calculating income tax per capita, 2014–2017 (€/capita)	Measures the economic power as well as purchasing power of the population by calculating the financial resources derived from income (wages, pensions, bonuses, etc.).	$\bar{x} = 9381.0$; $\sigma = 775.9$
2	Availability of jobs	Number of jobs relative to the number of persons in employment in the municipality, 2018 (index)	A small town with an abundance of jobs serves as an employment center and supports more balanced development while discouraging excessive long-distance commuting.	$\bar{x} = 84.4$; $\sigma = 24.3$
3	Employment structure	Share of employed in the service sector, 2018 (%)*	In the course of deindustrialization and tertiarization, the share of the service sector is increasing. Service activities are theoretically less intensive and consume fewer resources.	$\bar{x} = 56.7$; $\sigma = 8.9$
4	Price of housing	Average price per square meter of existing dwelling, 2018 (€/m ²)	Higher real estate prices usually reflect greater demand due to favorable socio-economic development, quality of the living environment, accessibility, etc.	$\bar{x} = 1450$; $\sigma = 513$
Social indicators				
5	Aging index	Ratio between the population over 65 and under 15, 2018 (index)**	The aging of the population poses a threat to economic growth and social security systems, especially pension and healthcare systems.	$\bar{x} = 141.7$; $\sigma = 29.5$
6	Unemployment rate	Average registered unemployment rate, 2018 (%)**	The unemployment rate reflects the underutilization of the labor force, it increases poverty and social exclusion of the population.	$\bar{x} = 8.4$; $\sigma = 2.8$
7	Educational structure	Share of the population older than 15 with higher education, 2018 (%)	A better educational structure is a crucial potential for socio-economic development, because it increases competitiveness, quality of life and social cohesion.	$\bar{x} = 24.2$; $\sigma = 4.6$
8	Accessibility of social services	Access to selected social services in the town: secondary school, nursing home, hospital, 2018 (number of services)	The indicator shows whether residents have access to more sophisticated health, education, and elderly care services, which contributes to a higher quality of life.	classes***

Environmental indicators				
9	Index of ecological stability	Ratio between ecologically stable areas and ecologically unstable ones in the town (within a radius of 2 km from the settlement center), 2019 (index)****	A favorable relationship between the natural (ecologically stable) and the built (anthropogenic) environment contributes significantly to a higher quality of the living environment.	$\bar{x} = 1.5$; $\sigma = 1,0$
10	Air quality	Synthetic expert assessment of air quality that considers the self-cleaning capacity of the air and sources of pollution in the town, 2018 (assessment)	Air quality is critical to the quality of the environment and to the health of people and ecosystems.	Expert assessment
11	Wastewater treatment	Share of the population hooked up to a municipal sewage system, 2017–2018 (%)	A higher proportion of treated wastewater from households is important to ensure better quality of underground and surface water sources, including drinking water sources.	$\bar{x} = 73.5$; $\sigma = 17.1$
12	Waste management	Share of landfilled municipal waste collected by public collection services, 2018 (%)**	According to the waste management hierarchy, landfilling is the least desirable and obsolete practice without recovering energy and materials from the waste.	$\bar{x} = 10.5$; $\sigma = 7.9$

Notes: \bar{x} – arithmetic mean; σ – standard deviation; *Due to the unavailability of data at the level of the settlement or municipality, small towns are given the value calculated for the statistical region in which they are located; **Lower values of the indicator are considered a more positive contribution to sustainable development; ***Classes with respect to the number of accessible social services in the town: 1 – three services; 2 – two services, 3 – one service; 4 – none of the social services cited exist in the town.

3. Results and discussion

3.1 Economic indicators of sustainable development of small towns

In looking at the economic conditions of small towns, we included four economic indicators that reflect the economic power of the population in the form of their income, the employment structure, and the availability of jobs relative to the number of persons in employment. The development potential of the city and the advantages of socio-economic conditions in terms of their attractiveness for residence and the economy, can also be inferred from real estate prices (Cigale et al., 2006; Vintar Mally, 2007). The calculation of indicators showed an above-average level of economic sustainability in seven small towns (Domžale, Grosuplje, Izola, Lucija/Portorož, Mengeš, Medvode and Sežana), which are all in either the Osrednjeslovenska or Obalno-kraška statistical region, two of the economically strongest Slovenian regions. None of these small towns achieve the highest scores in all economic indicators, but these are usually towns with a highly service-based economy, above-average economic power of the population, and high real estate prices. In contrast, nine towns were ranked in the group with a below-average level of economic sustainability, including all the small towns from the Jugovzhodna Slovenija (Črnomelj, Kočevje) and the Zasavska (Litija, Hrastnik, Trbovlje and Zagorje ob Savi) regions as well as Brežice, Jesenice and Rogaška Slatina.

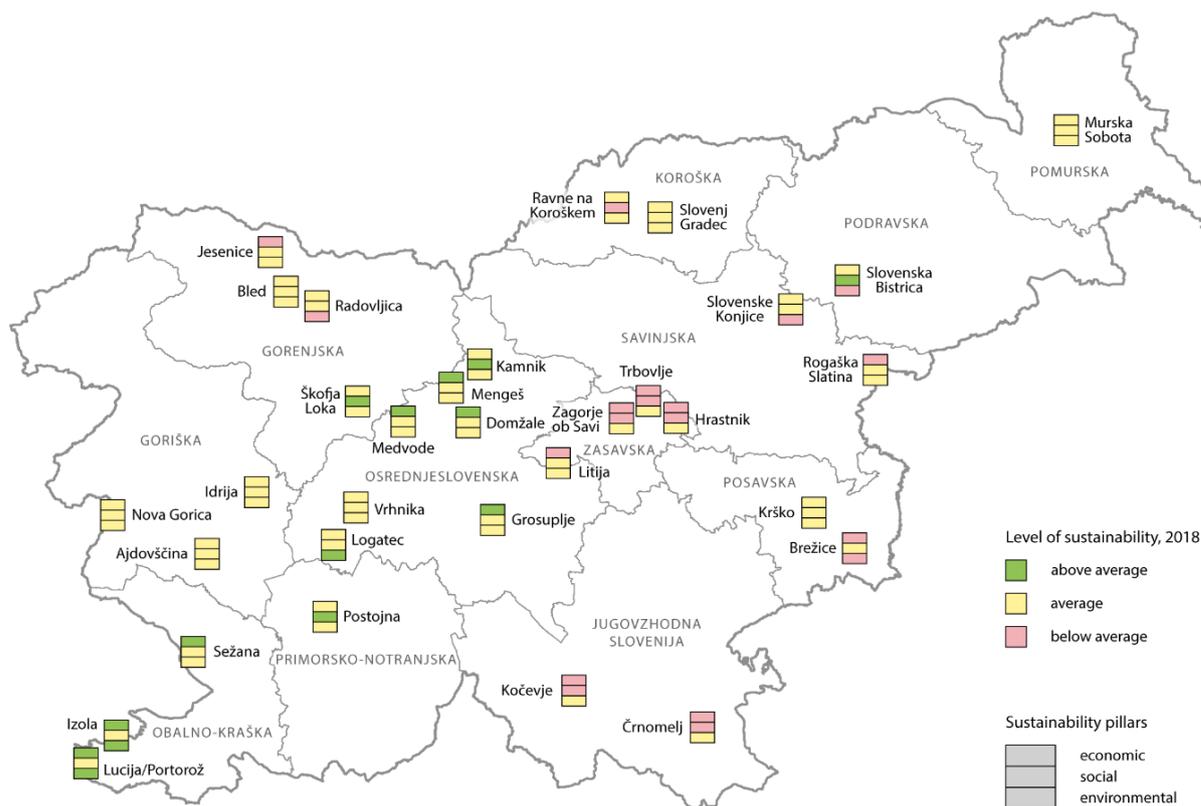


Fig 2. Level of sustainability of Slovenian small towns in the economic, social, and environmental spheres.

Note: According to the average value of classes in each development area (Table 3), small towns were classified into three groups: above average level (the average value is lower than 2.0), average level (2.0–2.9) and below average level (3.0 and higher) of economic, social, or environmental sustainability.

We found significant differences in the incomes of the population among small towns: in Kočevje and Črnomelj, for example, they reach only 75% of the average income of the inhabitants of Medvode (with a personal income tax base of 10,752 euros per capita). Nevertheless, there is a positive trend of decreasing income disparities, as these differences were considerably greater in 2002 (the coefficient of variation in 2002 was 15.9 compared to 8.3 in 2018). The economic power of the inhabitants of Brežice (a drop from the second to the fourth class) and Lucija/Portorož (a drop from the first to the third class) weakened the most between 2002 and 2018, while ten small towns remained in the same class and the relative position of the other fourteen changed by one class. A different picture emerges with respect to the availability of jobs, with an above-average number of jobs offered by the municipalities of Murska Sobota, Slovenj Gradec, Nova Gorica, Ravne na Koroškem and Sežana, and the least by Vrhnika and Litija as satellite small towns heavily dependent on Ljubljana for employment. With respect to employment structure and economic orientation, the small towns of the Osrednjeslovenska and Obalno-kraška statistical regions, with their strong emphasis on the service sector, are at an advantage, whereas service activities are most weakly represented in the Koroška region. The lower purchasing power and economic lagging behind of particular Slovenian regions are also reflected in the relatively lower demand for and prices of real estate in the large and small towns of these regions. In 2018, the range in the average price of an existing residential unit in the areas studied ranged from 680 to 2,620 euros per square meter. The lowest real estate prices (less than 1,100 euros per square meter) are in the Posavska region (Krško, Brežice), the Zasavska region (Hrastnik, Zagorje, Trbovlje), the Jugovzhodna Slovenija region (Črnomelj, Kočevje) and a few other parts of the country (Ravne na Koroškem, Murska Sobota, Slovenske Konjice). At the other extreme are the exceptionally high prices in tourist towns (Izola, Lucija/Portorož, Bled) and in small towns around Ljubljana, where not only the proximity of the capital is important, but also good accessibility (Domžale, Grosuplje, Medvode, Vrhnika). Economically, the greatest potential is shown by

small towns whose crucial advantage is either their location in the economically developed environs of Ljubljana or an explicit orientation around tourism.

3.2 Social indicators of sustainable development of small towns

In the social field, the goals of sustainable development relate to ensuring equal opportunities, increasing social capital, preventing poverty and social exclusion, and above all, achieving a higher quality of life. Through the selected social indicators, the investigation focuses on the educational structure, accessibility of social services, unemployment rate, and aging of the population in the small towns studied (Cigale et al., 2006; Vintar Mally, 2007). The calculation of indicators showed an above-average level of social sustainability in four small towns (Postojna, Kamnik, Slovenska Bistrica, and Škofja Loka), which were ranked in the first class usually in one of the indicators. Three of the four (Kamnik, Postojna, and Slovenska Bistrica) showed an above-average favorable age structure of the population, Postojna was also well-equipped with social services, and Škofja Loka had a low unemployment rate. Six small towns were included in the group with a below-average level of social sustainability. With the exception of the town of Ravne na Koroškem, all other towns – Črnomelj, Kočevje, Hrastnik, Trbovlje, and Zagorje ob Savi – were below average based on both economic and social indicators.

The continuing aging of the population in Slovenia poses a threat to the social security system, including in small towns, where the aging index increased from 94.8 to 141.7 in the period 2002–2018, thus significantly exceeding the national average (129.2). The least favorable age structure is shown by the towns of Murska Sobota, Idrija, Bled, Lucija/Portorož, Radovljica, and Trbovlje, with indices between 170 and 200. The aging index is generally lower in small towns in the Osrednjeslovenska region, but only in Kamnik (index 92.1) and Logatec (index 93.3) does the size of the younger population exceed that of the older population. The index increased the most in that period in Murska Sobota (from 104.3 to 198.3), Ravne na Koroškem (from 83.2 to 159.1) and Črnomelj (from 99.0 to 169.2). Unemployment in the municipalities where the small towns under study are located fell overall from 10.5% (in 2002) to 8.4% (in 2018). It should be noted that in the intervening time, unemployment in the country as a whole fluctuated significantly depending on the general economic situation. Thus, the registered unemployment rate as a result of the global financial and economic crisis was at its highest in Slovenia in 2014, when it averaged 13.4% in the municipalities of the small towns studied. Since then, it has decreased significantly, although it remains notably high in some places, such as in Kočevje (16.8%), Murska Sobota (14.8%) and Trbovlje (13.5%). The lowest registered unemployment rates in 2018 were in Idrija (4.2%), Škofja Loka (5.1%) and Radovljica (5.2%), where we also expect the population to be less susceptible to poverty and social exclusion as a result.

From the standpoint of development potential of small towns, it is also encouraging to observe that the educational structure of the population is constantly improving, which is also reflected in a steady increase in the share of the population with higher education. In Slovenian small towns, this share ranged from 12% (Jesenice) to 32% of the population over 15 years of age (Bled), with the relative standings among the towns remaining more or less constant over the long run. Small towns also maintain the accessibility of selected social services: secondary schools, nursing homes, and hospitals. In 2018, out of the 32 small towns analyzed, as many as 29 had a nursing home, 26 offered the possibility of secondary education, and ten small towns had a hospital (a general hospital in seven instances, and a specialized hospital, maternity hospital, and psychiatric hospital in three others). The presence of hospitals and secondary schools in particular shows that the functions of some small towns go beyond the local and play an important role in the wider inter-municipal or regional space.

Tab 3. Slovenian small towns and classes attained based on economic, social, and environmental indicators of sustainable development in 2018.

Small town	Population			Economic indicators – class*				Social indicators – class*				Environmental indicators – class*			
	2002	2018	index	1	2	3	4	5	6	7	8	9	10	11	12
Ajdovščina	6373	6678	105	3	3	3	2	2	2	2	2	3	1	3	1
Bled	5252	4944	94	2	2	3	1	4	2	1	3	2	2	2	2
Brežice	6510	6759	104	4	3	3	3	3	3	2	1	4	2	4	2
Črnomelj	5854	5573	95	4	3	3	4	3	4	3	2	2	2	4	2
Domžale	11582	12922	112	1	3	1	1	2	2	2	2	4	2	1	2
Grosuplje	6050	7549	125	1	3	1	1	1	2	2	3	3	2	3	2
Hrastnik	5865	5030	86	4	3	3	4	3	4	4	3	1	3	3	4
Idrija	5878	5839	99	1	2	3	3	4	1	3	1	1	3	2	2
Izola	10381	11353	109	3	2	1	1	3	2	3	1	3	1	1	2
Jesenice	13429	12926	96	3	3	3	3	2	2	4	1	1	3	2	4
Kamnik	12197	13724	113	2	3	1	2	1	2	2	2	2	3	2	3
Kočevje	9027	8240	91	4	3	3	3	3	4	4	2	3	2	2	2
Krško	6994	7097	101	3	2	3	3	2	4	2	2	3	3	2	1
Litija	6420	6593	103	3	4	3	3	2	2	3	2	2	3	3	3
Logatec	7616	9428	124	2	3	1	2	1	2	2	3	2	1	2	2
Lucija/Portorož	8641	8985	104	3	2	1	1	4	3	1	2	3	1	1	2
Medvode	4951	5247	106	1	3	1	1	3	2	2	3	3	2	4	2
Mengeš	5557	6591	119	1	3	1	2	1	2	2	3	3	2	1	2
Murska Sobota	12437	11129	89	3	1	3	3	4	4	2	1	4	2	1	3
Nova Gorica	13491	12968	96	2	1	3	2	3	2	2	1	3	2	2	4
Postojna	8548	9482	111	2	3	3	3	1	2	2	1	2	1	3	4
Radovljica	5937	6077	102	2	2	3	2	4	1	1	2	3	2	4	4
Ravne na Koroškem	7797	7268	93	2	1	4	3	3	2	4	3	2	3	2	4
Rogaška Slatina	4801	4935	103	4	2	3	3	3	3	3	2	3	2	2	2
Sežana	4876	5760	118	2	1	1	3	2	2	3	1	2	2	4	2
Slovenj Gradec	7712	7244	94	3	1	4	3	3	2	2	1	3	3	2	3
Slovenska Bistrica	6591	8016	122	3	3	2	3	1	2	2	2	4	3	3	3
Slovenske Konjice	4866	5092	105	3	2	3	3	2	3	3	2	3	3	4	2
Škofja Loka	12289	11611	94	1	2	3	2	2	1	2	2	2	3	2	2
Trbovlje	16290	13759	84	3	3	3	4	4	4	4	1	3	3	2	3
Vrhnika	7520	8701	116	2	4	1	2	1	2	2	3	3	3	3	1
Zagorje ob Savi	6893	6109	89	3	3	3	3	3	2	4	3	1	3	3	4

*The numbers of the indicators are ordered in the same way as in Table 2. Class 1 is the most favorable with respect to achieving sustainable development goals, class 4 is the least favorable.

3.3 Environmental indicators of sustainable development of small towns

To evaluate the environmental aspect of the sustainable development of small towns, we used four environmental indicators focused on waste management, wastewater treatment, air quality and the preservation of ecologically stable areas in towns. Through the selected indicators, we hope to illustrate the pressures of settlement and human activities in towns, as well as the resultant state of the environment and society's responses to perceived environmental problems. Due to changes in the calculation of two of the four selected environmental indicators, direct comparisons of the final results between 2002 and 2018 are not possible. The calculation of indicators for 2018 shows an above-average level of environmental sustainability in three small towns: Izola, Logatec, and Lucija/Portorož. All have a particularly good air quality assessment, a well-developed public sewer system, and below-average shares of landfilled municipal waste. In contrast, four small towns (Radovljica, Slovenska Bistrica, Slovenske Konjice, and Brežice) show below-average levels of environmental sustainability, mainly through below-average values of the ecological stability index and wastewater treatment options. We found smaller differences among Slovenian towns based on environmental indicators compared to economic and social ones, as most of the towns under study (25 out of 32) rank at the average level of

sustainability. Sixteen towns were ranked average based on economic indicators, and 22 based on social indicators.

Through the index of ecological stability, which is calculated from data on land use in the area of the town (within a radius of 2 kilometers from the center of the settlement), we can determine the relative proportions of ecologically stable areas (i.e., areas with lower degree of anthropogenic impact) and ecologically unstable areas (i.e., areas with higher degree of anthropogenic impact or built environment) in urban areas (Cetkovsky, 2007). Ecologically stable areas include areas of woodland, meadows, wetlands and water bodies, which are not only the backbone of ecosystem services and biodiversity in towns, but also significantly enhance the quality of the residential environment. Ecologically unstable areas include built-up land (buildings, roads, railways, parking lots, and other infrastructure) as well as cultivated land (fields, gardens, greenhouses, vineyards, orchards, and other permanent crops). Based on the national land use categories (MKGP, 2021), permanent grassland, wet meadows, forest, marshland, reeds, other wetlands and water bodies were considered ecologically stable areas. Due to the constant pressure of settlement, infrastructure, and economic activities, the index of ecological stability in Slovenian small towns is declining and in 2018 it averaged 1.5 (in the 26 towns studied in 2002, it was 1.8). Idrija (index 5.4), Zagorje ob Savi (3.4), Hrastnik (3.1) and Jesenice (2.8) have the best ratios, while Murska Sobota (0.2), Domžale (0.4), Brežice (0.4) and Slovenska Bistrica (0.5) have the worst.

Due to the lack of air quality measurements, we performed an expert assessment of air quality in small towns, taking into account both the sensitivity of air to pollution based on the physical-geographical characteristics of the city and its surroundings (e.g., poorer air self-cleaning capacity due to location in basins with frequent temperature inversions and poor ventilation) as well as sources of pollution in cities (i.e., the presence of major pollutants, congestion on the roads). Overall, air quality in the country has improved over the last two decades due to the restructuring of the economy, the gradual replacement of energy products, the installation of scrubbers by major polluters, and compliance with stricter environmental standards. Emissions of nitrogen oxides from traffic and particulate matter from household heating and traffic still remain problematic in towns, particularly in the colder part of the year, when the self-cleaning capabilities of the air are also poorer (Vintar Mally & Ogrin, 2015; Ogrin et al., 2016). After 2002, there were significant changes at the national level in the area of construction and modernization of environmental infrastructure: the sewage network was upgraded and improved, the construction of wastewater treatment plants with the possibility of tertiary treatment was accelerated, and there were major changes in solid waste management. Thus, in the municipalities where the small towns under study are located, in 2017–2018, an average of three-quarters of the population were connected to the public sewage network: in the best-performing municipalities, more than 90% of households were hooked up (Domžale, Izola, Lucija/Portorož, Mengeš, and Murska Sobota). Modified waste management practices are reflected in the low share of landfilled municipal waste disposed of through public collection. On average, this practice concerns only about 10% of all municipal waste collected in the country. Jesenice, Nova Gorica, Postojna, Hrastnik, Radovljica, Ravne na Koroškem, and Zagorje ob Savi stood out in 2018 for their unsustainable management and above-average shares (from 19% to 29%) of landfilled municipal waste, whereas in Vrhnika, Krško, and Ajdovščina less than 2.5% of the collected municipal waste was landfilled.

3.4 Level of sustainability of small towns in 2018 compared to 2002

After examining the level of sustainability in the economic, social and environmental fields, we calculated the average value of all three areas for each small town and thus determined the overall level of sustainability in 2018 and compared it with the assessment in 2002 (Figure 3). We found that only Izola and Lucija/Portorož, small towns from the Obalno-kraška statistical region, which stood out in terms of economic and environmental sustainability, achieved the highest level of sustainability, and both also improved their position since the first study. Most small towns show an average level of sustainability, with various combinations of below-average and above-average ratings, so in the end, they did not stand out in either a positive or negative sense. A below-average level of sustainability was calculated for six small towns, all of which had a below-average level of economic sustainability and mostly also a below-

average level of social sustainability: Brežice, Črnomelj, Hrastnik, Kočevje, Trbovlje, and Zagorje ob Savi. We observed that the least favorable conditions in terms of achieving the goals of sustainable development are shown in six out of a total of eight small towns in three statistical regions of the southeastern part of Slovenia. Compared to the 2002 rating, the towns of Brežice and Črnomelj fell sharply, as in the first period they had had average sustainability in all areas. In addition to these two, the relative positions of Bled, Radovljica, and Murska Sobota also deteriorated. In 2018, nine small towns had the same average of all three areas as in 2002, and the average value of all three areas improved for twelve small towns, but only in Izola, Lucija/Portorož, Postojna, and Litija did this occur to an extent sufficient to rank them at a higher level of sustainability in 2018. In the towns of Izola and Lucija/Portorož, this occurred thanks to a higher score in the environmental area, and in Postojna and Litija thanks to a higher score in the social area.

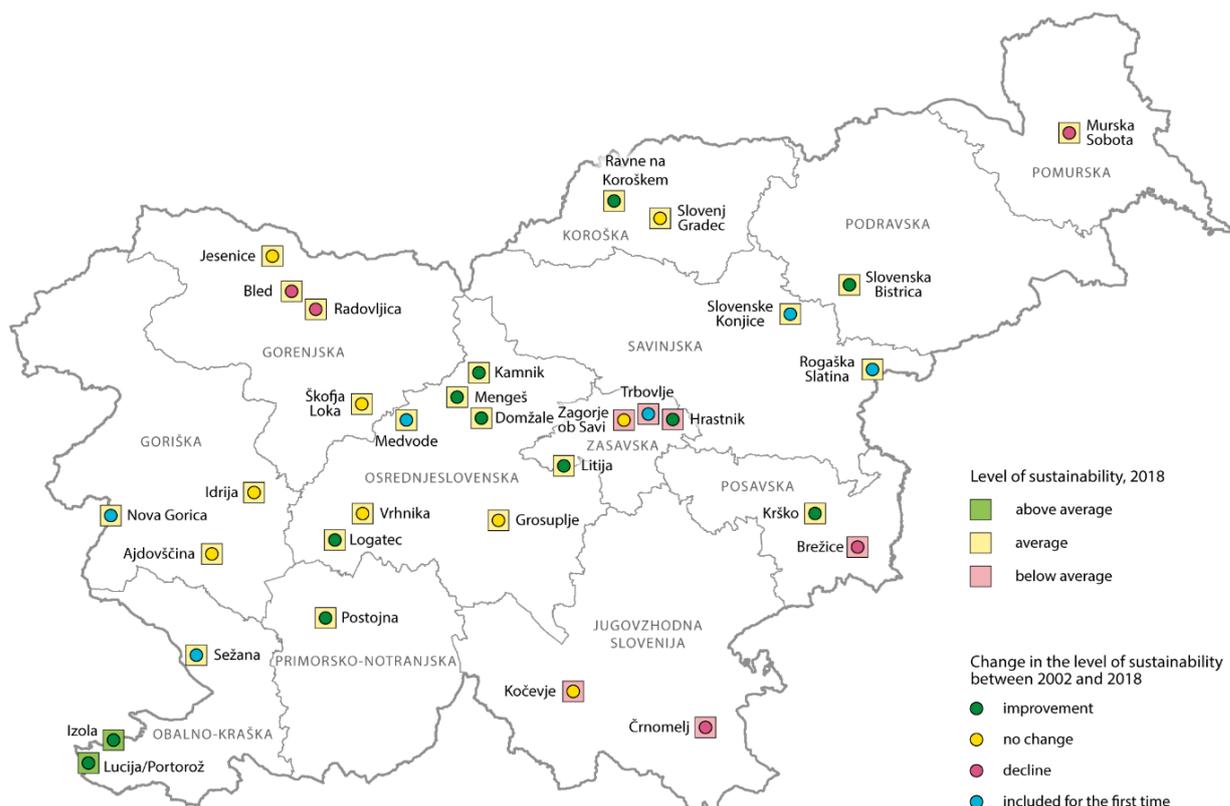


Fig 3. Level of sustainability of small towns in Slovenia with a comparison between 2002 and 2018.

4. Conclusions

The analysis of sustainable development indicators for Slovenian small towns showed positive trends between 2002 and 2018 for most of the indicators included, indicating progress towards the goals of sustainable development in the economic, social and environmental fields. In the economic field, economic growth is reflected in higher household incomes, with real estate prices rising at the same time, and an increasing share of the population employed in service activities. In this area, only the lower ratio between the number of jobs and the number of persons in employment is considered unfavorable, as fewer jobs were available in 2018 than in 2002. In the social field, the worsening age structure of the population is unfavorable for development; however, the lower unemployment rate, improvement of the educational structure of the population, and good access to social services are encouraging. With exception of worsening ratios between ecologically stable and ecologically unstable areas, which is mainly due to the loss of land as a result of rapid spatial development in small towns, environmental indicators also show progress towards environmental sustainability over the last two decades, all indicating a better quality of the residential environment in Slovenian small towns.

Judging by the number of small towns achieving below-average and above-average levels of sustainability in each development area (a total of sixteen small towns in the economic field, ten in the social field, and seven in the environmental field), overall the biggest differences among small towns are in achieving sustainable development goals in the economic field and the smallest in the environmental field. This finding is also in line with the results of research on sustainable development trends at the level of Slovenian statistical regions (Vintar Mally, 2018), which are also characterized by the largest and most entrenched interregional differences being in the economic field, while particular parts of the country differ at least in the environmental field. We can also confirm our initial assumption that small towns in Slovenia are successfully approaching the goals of sustainable development in general, but the relative position of most small towns (17 of 26) changed between the two periods studied depending on the economic, social and environmental situation in them and in the country. These findings are encouraging for rural areas, as small towns should be the backbone of rural development, and the inhabitants of small towns also influence the social, economic, and environmental sustainability of their wider hinterland through supply and demand.

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