

**Regionalization in European Economic Space**

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**SUSTAINABLE DEVELOPMENT
OF CENTRAL AND PERIPHERAL
REGIONS OF SLOVAKIA****Abstract**

Aspects of regional and local sustainable development are turning into key elements of strategic planning documents in EU countries. The topic of sustainable development includes issues of both urban and peripheral areas. It encompasses the classic fields of environmental protection and green energy, as well as the parameters of social inclusion, creative capital development, community and neighbourhood building, etc. The paper reviews the implementation of sustainable development goals in Slovakia with a focus on the programme promot-

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ing green infrastructure and the practice of mixed-use urban spaces. The principles of green infrastructure are introduced in Slovakia in line with the concepts of NECONET ecological networks and ÚSES systems of territorial environmental sustainability. The 2030 Environmental Strategy of Slovakia covers three areas, namely water protection and biodiversity, climate change and air protection, and green economy. Prominence is given to the development of renewable energy in the country. The paper determines the main obstacles to the development of Slovakian green infrastructure compared to that of the EU. These include a lack of financing, slow adoption of legislation, and lack of regulation in the land ownership rights.

Key Words:

sustainable development; green infrastructure; ecological networks; mixed use; renewable energy.

JEL: Q01, R10, R58.

6 figures, 35 references.

Introduction

In modern times, it has become obvious that competition between localities (regions) is often more important and intense than competition between entire countries. Therefore, ensuring a high level of local economic development becomes one of the strategic priorities for governments. Thus, the World Bank website states that local economic development provides local governments, representatives of the private and non-profit sectors, and local communities with the opportunity to work together to improve the local economy. It aims to increase competitiveness, thereby stimulating sustainable inclusive growth (Lishchynskyy, 2016; Lishchynskyy et al., 2019; 2021).

In general terms, local economic development can be defined as a structural and dynamic process that, thanks to the effective use of local resources, leads to a long-term improvement in the standards of living of the population in a locality or region within the framework of a separate state (Blakely, 2004; Tello, 2010). In industrialized countries, local economic development has traditionally been considered in the context of changes affecting the ability of the local economy to stimulate economic growth, generate jobs and create new wealth for local residents (Blair, 1995). However, over the last decade, the view of the concept has gradually shifted from local growth to local sustainable development capable of ensuring the welfare of the local community in the future. The sustainable local development is an output of synergy of economic, social and environmental sustainability, which are reflected in policies and functions of local governments (Vitálišová, 2017).

Theoretical Foundations of Regional and Local Sustainable Development

A large number of definitions and interpretations of sustainable development can be found in scientific literature. The World Commission on Environment and Development (1987, p.41) interprets sustainable development as «development that meets the needs of the present without compromising the ability of future generations to meet their own needs». D. Blewitt (2012, p.13) believes that sustainable development «is about protecting and conserving the planet's natural environment and promoting social equity and a degree of economic equality within and between nations».

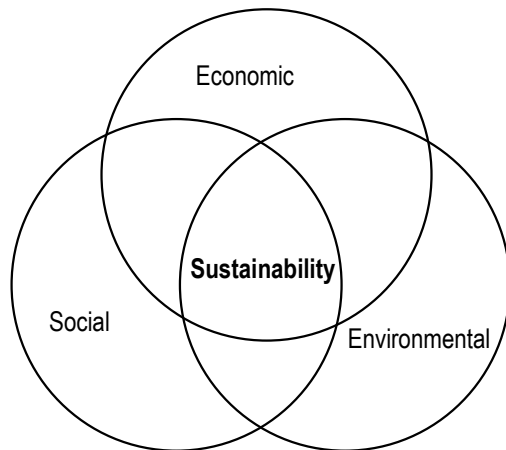
Since sustainable development is the main goal of many institutions, there is a constant need to critically rethink the foundations of what they are trying to achieve, the price of the benefits from specific investors whose interests may be dominant. In this regard, the main emphasis is on management decisions related to specific people and the local environment (Elliott, 2013).

It is worth noting that R. Hansmann and co-authors interpret sustainable development as an integrated concept with three fundamental dimensions: environmental, social and economic (Hansmann et al., 2012). These three integrative concepts of sustainability can be represented as circles (fig.1).

In Fig. 1, the intersection of the three circles represents the goal of sustainable development as an aspiration to maximize beneficial outcomes in all three areas. The middle of the overlapping circles reflects the principles of sustainable development. A similar vision of sustainable development is reflected in the «planner's triangle» of S. Campbell (Fig. 2).

Figure 1

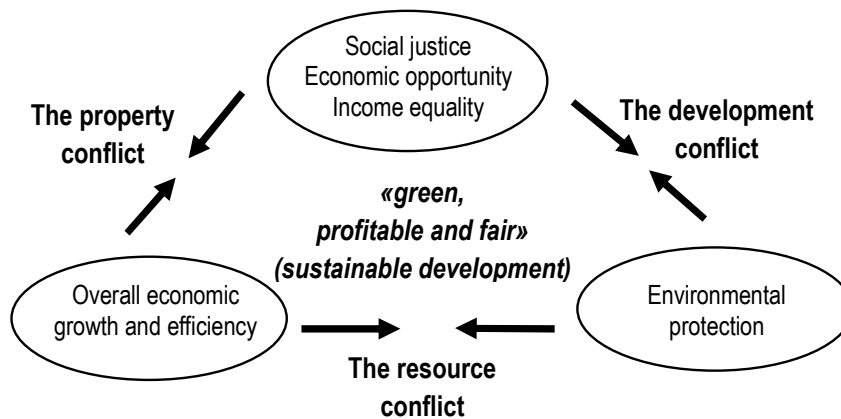
Three pillars of sustainability



Source: Hansmann, R., Mieg, H. A., & Frischknecht, P. (2012). Principal sustainability components: Empirical analysis of synergies between the three pillars of sustainability. *International Journal of Sustainable Development & World Ecology*, 19(5), 451-459. <https://doi.org/10.1080/13504509.2012.696220>

Figure 2

Planner's triangle



Source: Campbell, S. (1996). Green cities, growing cities, just cities?: Urban planning and the contradictions of sustainable development. *Journal of the American Planning Association*, 62(3), 296-312. <https://doi.org/10.1080/01944369608975696>

S. Campbell (1996) presents a theory that forms three main goals for planning: general economic growth and efficiency, environmental protection and social justice, economic opportunities, income equality. According to Campbell, the middle of this triangle is «green, profitable and fair», and for planners, therefore, it should be the ideal of sustainable development. This theoretical approach highlights serious conflicts in the areas of economic growth, environmental protection and social justice, where no point can exist in isolation. And at the heart of the triangle lies mutual dependence, which is based on both opposition and cooperation. Thus, even theoretical models reflect the complexity of achieving the goals of sustainable development and its inherent application of compromises between stakeholders.

Green infrastructure can be one of the levers used to achieve sustainable development, even if it is closer to the natural and environmental areas. In 2015, the member states of the United Nations adopted the 2030 Agenda for Sustainable Development, which contains joint guidelines with 17 sustainable development goals. These goals must be achieved while mitigating climate change and working to conserve oceans and forests. The eleventh Sustainable Development Goal «Make cities inclusive, safe, resilient and sustainable» contains numerous sub-goals, which often emphasize strengthening inclusive and sustainable urbanization, protecting cultural and natural heritage, and reducing the environmental impact of cities (United Nations, 2015).

Sustainable Development of Slovakian Regions

Aspects of sustainable development are starting to play an instrumental role in the implementation of national, regional and local strategies in Slovakia. For instance, issues of environmental protection are under the jurisdiction of the Ministry of Environment of the Slovak Republic and its regional offices in cooperation with the Ministry of Investments, Regional Development and Informatization of the Slovak Republic. Meanwhile, local authorities are usually responsible for the implementation of sectoral policies.

Aspects of sustainable development apply to both urban and rural areas. They cover a wide range of issues: environmental protection and ecology, social justice, development of communities and neighbourhoods, walking and cycling paths, public transport and stationary parking spaces, greenhouse effect and water purification, continued support for established development areas, social construction, preservation of local identity, tourism development, etc. All this and more, including tools for the development of local cooperation and public-private partnership, temporal phasing, participation in public and international funding projects, architectural and urban design competitions.

In 2021, Slovakia approved a new 10-year environmental protection strategy called *Greener Slovakia – Environmental Policy Strategy of the Slovak Republic*. The 2030 Environmental Strategy was developed by the Institute of Environmental Policy (IEP) under the Ministry of the Environment in cooperation with 160 experts from other ministries and sectors. The government's action plan sets specific and measurable targets to be achieved by 2030 (Ministry of Environment of the Slovak Republic, 2019).

The strategy covers three areas, including water and biodiversity protection, climate change and air protection, and the green economy. In addition, the strategy proposes better protection of national parks and forests (75% of the area of national parks is to become an area without human intervention by 2030). The strategy also mentions green public procurement, which is expected to increase to 70% by 2030. Environmental education should also become part of formal education.

The principles of green infrastructure of Slovakia are determined in line with the concepts of NECONET (National Ecological Network) and systems of territorial environmental sustainability ÚSES (Slovak – Územný systém ekologické stability) (Slovak Environment Agency, 2020). According to D. Bennett (2004), ecological networks are coherent (coordinated) systems of natural or semi-natural landscape elements that are established and managed to support or restore ecological functions as a means of preserving biodiversity and providing appropriate opportunities for the sustainable use of natural resources. Ecological networks in Slovakia are implemented at several levels: NECONET – at the national level, ÚSES – at the interregional, regional and local levels.

It is worth noting that the ÚSES toolkit, being part of the land consolidation process, is more adapted to the development of green infrastructure in peripheral zones, outside the boundaries of large cities. However, the greening of territories is also considered one of the key priorities of modern urban planning.

Thus, the general consensus among researchers is that urban green spaces ensure the ecological integrity of cities and have a positive effect on the health of the population. The main proven advantages include: reduction of air pollution due to absorption of certain substances from the atmosphere (Nowak et al., 2006); a more moderate temperature of the settlement due to the provided shade and cooling of the area (Cummins & Jackson, 2001); noise absorption; groundwater replenishment noise absorption; groundwater replenishment (Escobedo et al., 2011). Numerous studies have found a link between green spaces and the health or mortality of the population (Dzhambov et al., 2020, Coutts et al., 2010). There is a strong correlation between the presence of parks and local physical activity and related health promotion (Sallis et al., 2012). The positive influence of parks on reducing the level of obesity has also been confirmed (Ogden et al., 2008). In addition, green spaces are associated with psychological well-being (Ernstson, 2013) and reduced stress (Woo et al., 2009).

The 2030 Environmental Strategy of Slovakia provides for several main directions of projects for the development of green infrastructure of cities, for example, greening public spaces and roofs, increasing the collection of rainwater, connecting transport projects with nature, expanding city parks and urban green areas, as well as promoting biodiversity in urban areas.

Such initiatives are focused on creation of ecological networks and protection of biodiversity but, unfortunately, statistics show that in practice they do not bring positive results. About 60% of the world's ecosystem is degraded and overloaded. Only 17% of biotopes and species and 11% of key ecosystems are in good condition protected by European legislation. This negative phenomenon is also present in Slovakia (Izakovičová & Šwiąder, 2017).

When considering the principles of planning for the sustainable development of cities in Slovakia, the concept of *mixed use* cannot be avoided. A typical general plan of a city, district or redevelopment zone consists of coloured polygons that represent different functional purposes, e.g. residential, commercial, industrial, agricultural, cultural, sports, green areas, with different protection levels. However, if such a monofunctional approach is used, some areas are left idle for a significant part of the day, while certain structural shifts may even lead to the total abandonment of the territory. To avoid such consequences, planners often employ the principle of mixed use, wherein certain parts of the building are used concurrently for residential and other purposes (for example, basements or lower floors are given over to commercial, industrial, institutional establishments). Of course, designing the entire city according to the principle of mixed use will not solve all problems, but it often allows for a significant reduction in the volume of the housing-only areas and shorter commutes.

For example, the capital of Slovakia, Bratislava, is an example of urban development done according to the zonal principle since the 1960s. The current general plan of the city was formed in 2007 and provided for the use of a mixed approach. According to A. Bindzárová's research, the share of mixed-use areas in Bratislava is only 5% (Fig. 3).

Since 2017, the Ministry of the Environment of the Slovak Republic and the Slovak Environmental Agency have been organizing the ENVIROMESTO competition. The aim of this competition is to raise general awareness about the preservation and protection of the environment, as well as to promote and reward cities that apply environmental policies. This competition includes four categories, one of which is dedicated to nature and landscape protection and green infrastructure. So far, three competitions have been held. The first winner in this particular category was the city of Nitra, the second was the city of Banská Bystrica, and the third was the city of Púchov (Fig. 4).

*Figure 3***Mixed-use areas in Bratislava (highlighted in black)**

Source: Bindzárová, A. (2016). Type and size of urban cell as tools for sustainable urban (re)development. *Procedia Engineering*, 161, 1482-1489. <https://doi.org/10.1016/j.proeng.2016.08.614>

The main campus of the Slovak University of Agriculture is also located in Nitra. In 2019, this university started the project «Green infrastructure at the green university». This project focuses on the development of green infrastructure that improve environmental conditions within the city and adapt urbanized areas to climate change (Central Registry of Projects, 2019). There were, of course, earlier projects and funding opportunities too, such as green infrastructure funding to improve water retention or the funding of 38 green infrastructure projects in early 2018 (Ministry of Environment of the Slovak Republic, 2019).

Re-elected in 2020, the government presented a Manifesto that explicitly mentions the concept of green infrastructure in the context of combining green, grey and social infrastructure to achieve cumulative benefits. The Manifesto also mentions the goal of focusing on green measures to curb or slow surface water runoff and enhance rainfall retention. Slovakia will also actively support the achievement of the Sustainable Development Goals (Ministry of Agriculture and Rural Development of the Slovak Republic, 2018).

Figure 4

Winners of the ENVIROMESTO competition in the category of environmental protection and green infrastructure development



Source: Central Registry of Projects. (2019). Agreement on the provision of a non-refundable financial contribution [in Slovakian]. <https://www.crp.gov.sk/data/att/89067.pdf>

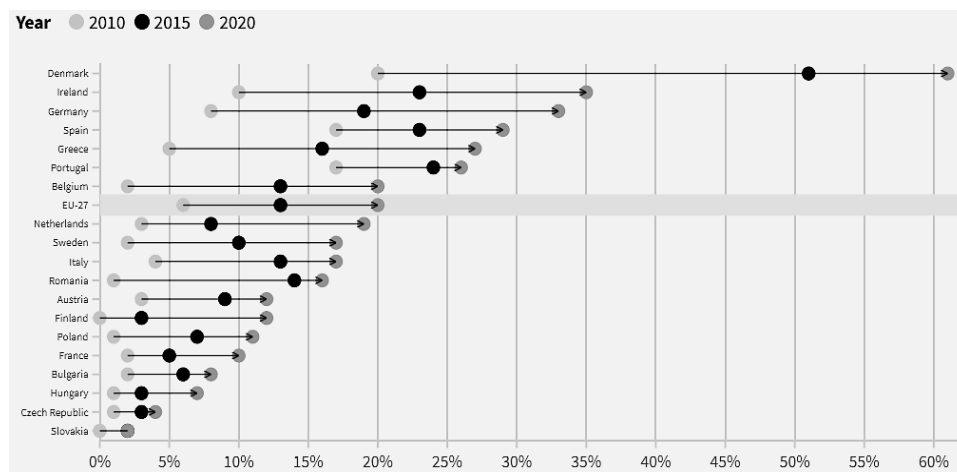
An interview with representatives of Slovak municipalities (Uher, 2020) highlights the main obstacles to the development of green infrastructure (compared to the average parameters for the EU). These are lack of funding (noted by practitioners, but not mentioned by representatives of scientific research institutions), slow adaptation of legislation and land ownership rights. Respondents also noted the frequent prioritization of grey infrastructure over the green and the blue (especially characteristic of urban centres), as well as insufficient public awareness of the prospects for the development of green infrastructure. Reportedly, the advantages of green infrastructure are often ignored when developing strategic priorities for local development, which results in a lack of documentary support for objects of existing and new green infrastructure in cities and peripheral territories.

The transition to renewable energy sources is one of Slovakia's weaknesses compared to other EU members in terms of local sustainable development. In particular, the share of renewable electricity sources in the EU has increased significantly in recent years, reaching 38% in 2020 (compared to 34.6% in 2019). For the first time it has overtaken electricity production based on fossil sources, which fell to 37%. This is an important milestone in the European transi-

tion to clean energy. However, the growth of renewable energy sources is still too slow. Growth in wind and solar generation needs to nearly triple to meet European Green Deal targets by 2030, from 38 TWh per year on average in 2010-2020 to 100 TWh per year on average in 2020-2030. Encouragingly, wind and solar increased by 51 terawatt hours in 2020, well above the 2010-2020 average, despite some impact from Covid-19. However, at the same time many countries continued to see almost zero growth rates for wind and solar energy. This especially applies to Slovakia, where energy generation from the sun and the wind does not provide even 5% of country's needs (Fig. 5).

Figure 5

Share of wind and solar electricity in total energy generation

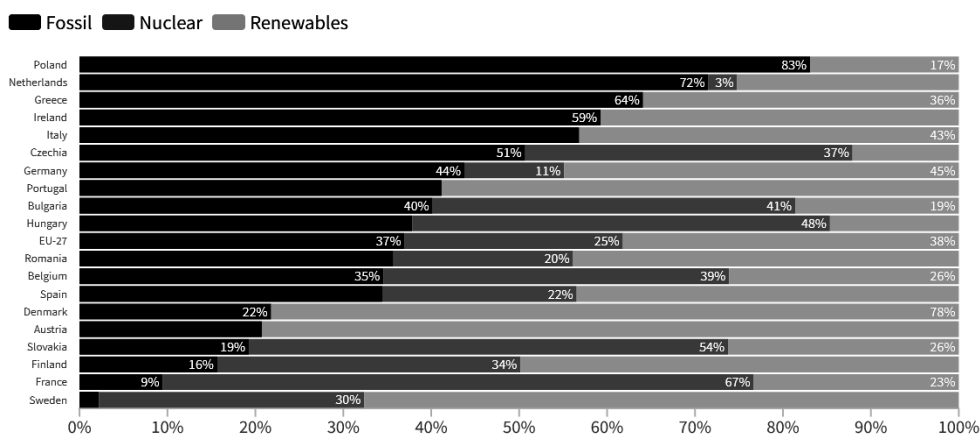


Source: Jones, D. (2022, Mar 30). Global Electricity Review. EMBER. <https://ember-climate.org/insights/research/global-electricity-review-2022/>

At the same time, the structure of renewable and traditional sources in Slovakia is far from the worst. Fossil sources account for only 19% of energy generation, while a lion's share falls on the production of nuclear energy (Fig. 6).

Figure 6

Ratio of energy production from traditional, nuclear and renewable sources



Source: Jones, D. (2022, Mar 30). Global Electricity Review. EMBER. <https://ember-climate.org/insights/research/global-electricity-review-2022/>

Conclusions

Therefore, issues of sustainable development concern both urban and peripheral areas and cover both the classic areas of environmental protection and green energy, and parameters of social inclusion and development of creative capital, community and neighbourhood building, etc.

Despite some obstacles, Slovakia has managed to achieve notable progress in the development of green infrastructure over the past decade. The country's environmental strategy until 2030 covers three areas, including water and biodiversity protection, climate change and air protection, and green economy. Aspects of green infrastructure are included in numerous strategies and laws at both the pan-European and Slovak levels, and their role as a separate category of competitiveness has increased the level of public awareness of the green infrastructure issue. The principles of green infrastructure are introduced in Slovakia in line with the concepts of NECONET ecological networks (national level) and ÚSES systems of territorial environmental sustainability (regional and local levels). However, because of the great criticism associated with the ineffective use of ecological networks and ÚSES (the weakest part is monitoring and control), the reform of the planning and regulatory system is preparing. The result

should be a landscape-ecological plan that should reflect the ecological restrictions/protection, but also allows the effective exploitation of economic, social and innovative potential of territories.

Special attention in Slovakia is paid to the development of renewable energy sources. Although the share of traditional sources of electricity is relatively low, it is not accompanied by a high level of energy generation from solar and wind electricity (the bulk of the energy generation comes from nuclear power). Nevertheless, the fuel crisis in the EU caused by the invasion of the Russian Federation into Ukraine can significantly affect sustainable territorial development both positively (stimulate renewable energy sources) and negatively (reduce funding for less urgent priorities).

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