



NAME OF THE GOOD PRACTICE/PROJECT

Urban sustainable development in the 21st century - assessment of key factors, planning approaches and environmental relationships

Keywords:

Urban sustainable development, Agenda 2030, Green infrastructure, Spatial planning, Climate change adaptation

The aim of the project:

- Overview of the theory, methodologies for evaluating and implementing sustainable urban development in a global, European and national context
- Developing a methodology for assessing sustainable urban development suitable for the Slovak Republic, using qualitative and quantitative indicators that equally represent all dimensions of sustainable development.
- Developing the concepts of nature-friendly solutions and green infrastructure for SR conditions
- Developing the procedures for assessing green infrastructure functions and ecosystem services in cities
- Applying the results of the theoretical and methodological part of the project in selected cities.

Partners:

Department of Ecology and Environmental Sciences, Faculty of Natural Sciences, Constantine the Philosopher in Nitra

Project implementation time:

1.1.2020 - 31.12.2023

Budget:

2020 – €20143, 2021 – €20741, 2022-?, 2023-?

Granted by:

Ministry of Education, Science, Research and Sport of the Slovak Republic – Vedecká grantová agentúra = Scientific grant agency VEGA 1/0706/20

Priority line/Specific objective: if it is related to a specific priority line or objective

Context: please describe the socio-economic context of the project (300-400 words)

The project focuses on the issue of sustainable urban development, which has been neglected in Slovakia for a long time despite the fact that it is one of the main objectives of the 2030 Agenda (SDG 2030). The project will build on the implemented activities in the SR in 1998-2006, but taking into account the current state of knowledge and incorporating modern approaches and methodologies used in the world, especially in the EU. Based on the review of the theory and methodology of evaluation and application of sustainable urban development in the overall development (planning and specific management of urban settlements), a proposal for the evaluation procedure suitable for the Slovak conditions will be elaborated using appropriate indicators. Strong emphasis will be placed on the environmental aspect, in particular by developing the concept of nature-friendly solutions and green infrastructure in the Slovak conditions, as well as evaluating the functions and services of green infrastructure in cities.

Description: please describe the good practice (half a page)

The cities and their development are one of the greatest challenges of the 21st century. In 2015, the UN approved 17 Sustainable Development Goals (SDGs) under the 2030 Sustainable Development Agenda, representing the Global Development Program for the next 15 years. The importance of sustainable development at the local level is underlined by the inclusion in the Agenda 2030 of a separate objective on cities and urban development (SDG 11: Creating Inclusive, Safe, Resilient and Sustainable Cities and Human Settlements). other sustainable development goals.

Estimates show that the proportion of global population in the cities will increase to 66% by 2050 (UN, 2018), and urban development has a serious impact on the environment and natural resources (McDonald et al., 2008). As a result, urban populations face a changing climate (McCarthy et al., 2010), a polluted urban environment, or social and economic inequalities (Haase et al., 2017).

On the basis of SDG 11, the New Urban Agenda (NUA) was defined and adopted, which not only confirms urbanization as a key political issue at the highest international level, but also underlines the continued reliance on the indicators, standards and similar tools in implementing the urban policy and guiding practices (Joss-Rydin, 2018).

Great attention is also paid to the issues of evaluation, and/or measurement of urban development - since 1992, the groundbreaking UNCED Conference in Rio de Janeiro (1992) has produced a number of publications on the indicators of sustainable development (Moldan and Billharz 1997; Hardi and Zdan 1997; Meadows 1998; Hak et al. 2007; Bell and Morse 2008; Wu and Wu 2012; Bell and Morse 2018).

In the Slovak Republic, focus was on this area only in the years 1995-2005 - several projects were implemented and several papers were published (eg Huba et al. 2000, Mederly et al. 2003, Mederly, Hudeková 2006).

The central EU policies for sustainable urban development include, in particular, the Nature-Near Solutions (NBS) and Green Infrastructure (GI) (EC, 2013; EEA, 2017).



Horizon 2020

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 870644

The NBS is a concept that understands the developmental challenges as an opportunity to innovate, in which the human interventions are to boost biodiversity, natural potential and provide many socio-ecological benefits to human well-being (Nesshover et al., 2017; Scott et al., 2015).

The GI approaches, in turn, apply the NBS concept in practice, particularly in the context of the urban environment, the development of green and blue networks and their integration into the built-up environment. The interventions include building high-quality green areas and the adoption of ecological-technical measures, while these are planned with the participation of a wide range of actors. However, the effective application of GI is hindered by various local conditions in the individual cities (Mell et al., 2017).

In general, vegetation has become an integral part of human life in an urbanized environment. People enrich their surroundings and life with the functions and benefits of vegetation (Daniel et. Al., 2012, Barrera, 2016). According to Špulerová (2006), vegetation has a positive impact in the urbanized environment, especially by improving the microclimate, ecological stability, eliminating the threats to the urban environment and biodiversity in the cities, such as climate change or an unstable hydrological cycle, and it also affects sustainable development, e.g. environmental education, public health, recreational services, and psychological and aesthetic functions (Nagyová, Pallagiová, 2009). **Functional efficacy and efficacy is the extent and extent of action of green matter on the environment and organism** (Rózová, Ježíková, Vavříková, 2007, Finka, 2008, Plieninger et al., 2013).

The proposed GI solutions and measures are tested according to the local specificities in the cities around the world, seeking to implement functional solutions. For example, in the UK, the emphasis is on environmental, recreational and health benefits of GI. The Nordic countries, such as Denmark, integrate GIs as adaptation measures for climate change and as part of building a quality public space. In Germany, they have transformed several “brownfields” into natural environments and community gardens, pointing to their recreational, socio-economic and ecological potential.

The integration of local project experiences and practices, a common communication platform (the GI concept), and the involvement of different actors are the prerequisites for quality adaptation strategies and urban agendas (Matijssen et al. 2017).

NBS and GI-based projects are also beginning to flourish in Slovakia. In the context of climate change adaptation strategies (e.g. Košice, Trnava, Bratislava), the importance of vegetation and natural areas in the city is emphasized. The revitalized areas in Bratislava - Karlova Ves attract pollinators and are also used by local residents (NO Živica). The GI solutions are created with the participation of residents, the general public and the private sector in an effort to create a strategically planned GI in this city district.

Results: please describe the outcomes of the project (200-400 words)

2020

- An overview of the issues and methods applied mainly in European and other research. We build mainly on the outputs of completed EU projects (Openness, Green Surge), the approaches applied in the ongoing EU projects (Interreg-Perfect, Enable, Los Dama), and other research activities in the field of GI and NBS, such as the international platform bringing together the experts and actors in the field (ThinkNature).

- Overview of the application of UR indicators at different levels and in different countries
- Overview of research in the field of evaluation of vegetation and its functions in the urban environment
- Study of literature and information sources (publications, proceedings, scientific studies and articles, applied work)
- Networking with the selected institutions dealing with the issue, establishing cooperation, consultations and bilateral meetings

2021

- Completion of the theoretical part of the project - summary of acquired knowledge, starting points for research within the SR
- Summary of current trends in urban planning in the SR, reflected in the working framework of the principles and approaches of NBS and GI.

- Creation of an application methodology for the evaluation of UR cities in the Slovak Republic, with a focus on the introduction of appropriate UR indicators, creation and implementation of UR indicators and application of NBS and GI approaches in Slovak cities

- Selection of model sites for case studies (cities and city districts - preliminary candidates: Bratislava- Karlova Ves, Trnava, Nitra, Trenčín)

- Contacting and establishing cooperation with the selected cities
- Definition and characteristics of GI elements in the cities
- Evaluation and testing of selected approaches and methods of urban planning in the model cities - introductory phase
- Evaluation of selected procedures for applying the GI and NBS functions and services in the model cities - introductory phase

2022

- Evaluation and testing of selected approaches and methods of urban planning in the model cities – in the research phase
- Evaluation of selected procedures for the application of the GI and NBS functions and services in the model cities – in the research phase

- Workshops and meetings in model locations
- Consultations, sharing of experiences, presentation of partial results - partner workplaces abroad, international conferences

2023

- Assessment of results from the model cities - focus on efficiency and sustainability of urban planning
- Integration of partial project outputs into the final synthesis
- Modification and design of selected procedures for applying the GI and NBS functions and services in the model cities
- Design and pilot evaluation of the indicators of sustainable development in the model cities
- Fine-tuning of the procedures for the evaluation of green infrastructure functions and proposals for the use of the green infrastructure concept in spatial planning
- Consultation, sharing of experiences, presentation of results - partner workplaces abroad, international conferences.



Success factors: preferably this kind of information should be requested from partners involved in the good practice, please also add your insights. (300-500 words)

Limiting factors: preferably this kind of information should be requested from partners involved in the good practice, please also add your insights. (300-500 words)

Applicability and upscaling: based on success and limiting factors, and the context can this be applied in a different area? If yes, what are points that need to be taken into consideration? If no, what are the barriers? (300-400 words)

Others: please provide pictures, links, references etc. related to the good practice, please make sure that all of the pictures are copyright free or have permission to be used on our website.

Project outputs – publications:

- Mederly, P., Vaňo, S., Michalina, D., Ševčík, M., 2021. Assessing sustainability of Slovak cities with the ecosystem services approach.
- In: Cities as socio-ecological systems. Book of abstracts. Third World Conference of the Society for Urban Ecology, 7-9 July 2021, Poznań, Poland. 250 pp.
<https://share.pppt.poznan.pl/index.php/s/18mzb2jYnK83xCd#pdfviewer>
- Michalina D., Mederly P., Diefenbacher H., Held B., 2021. Sustainable urban development: A review of urban sustainability indicator frameworks. - In: Sustainability. MDPI, ISSN 2071-1050, Vol. 13, Is. 16: 9348. DOI: <http://doi.org/10.3390/su13169348>
- Murgaš, F., Petrovič, F. 2020. Quality of life and quality of environment in Czechia in the period of the COVID-19 pandemic. Geograficky Casopis, 2020, 72(3), pp. 261–274.
- Nozdrovická, J., Dostál, I., Petrovič, F., Jakab, I., Havlíček, M., Skokanová, H., Falt'an, V., Mederly, P. 2020: Land-use dynamics in transport-impacted urban fabric: A case study of Martin-Vrútky, Slovakia. Land, 273, DOI 10.3390/LAND9080273
- Petrovič, F., Murgaš, F. 2020: Holistic and sustainable quality of life conceptualization and application, Folia Geographica, 2020, 62(1), pp. 77–94 <http://www.foliageographica.sk/unipo/journals/2020-62-1/550>
- Rózová, Z., Supuka, J., Klein, J. Et al., 2021: Effect of vegetation structure on urban climate mitigation. In: Acta Horticulturae et Regiecturae, Nitra, Slovaca Universitas Agriculturae Nitriae, 2020, pp. 60–65. DOI: 10.2478/ahr-2020-0013. https://www.researchgate.net/publication/346279584_Effect_of_Vegetation_Structure_on_Urban_Climate_Mitigation
- Rózová, Z., Tóth, A., Pástorová, A., 2021: The Impact of Vegetation Quality and Composition on Recreational Cultural Ecosystem Services. In: Fialová, J. (ed.), 2021: Public recreation and landscape protection - with sense hand in hand! Křtiny, Czech Republic, Conference proceedings, Vol. 2021, 540 p., ISBN 978-80-7509-779-8. https://www.researchgate.net/publication/351904671_The_Impact_of_Vegetation_Quality_and_Composition_on_Recreational_Cultural_Ecosystem_Services
- Vaňo, S., Stahl Olafsson, A., Mederly, P., 2021: Advancing urban green infrastructure through participatory integrated planning: A case from Slovakia. In: Urban Forestry and Urban Greening. – Elsevier, ISSN 1618-8667, Vol. 58, n. 126957. DOI: <https://doi.org/10.1016/j.ufug.2020.126957>
- Vojteková, J., Tirpáková, A., Petrovič, F., Izakovičová, Z., Vojtek, M. Spatial analysis of historical objects with defensive function in Slovakia. Geocarto International, <https://www.tandfonline.com/doi/full/10.1080/10106049.2021.1978561>
<https://doi.org/10.1080/10106049.2021.1978561>

