

# Implementing Green and Blue Infrastructure in Cities

## How Scientific Outputs Could Improve Policy Making on a Local Level

**AUTHORS:** Louda, J.<sup>1</sup>; Brabec, J.<sup>1,2</sup>; Macháč, J.<sup>1</sup>; Grunewald, K.<sup>3</sup>; Syrbe, R.-U.<sup>3</sup>; Brzoska, P.<sup>3</sup>; Dubová, L.<sup>1</sup>

**AFFILIATION:** <sup>1</sup>Institute for Economic and Environmental Policy, J. E. Purkyně University, Ústí nad Labem, Czech Republic, [www.ieep.cz](http://www.ieep.cz), \* [louda@ieep.cz](mailto:louda@ieep.cz)

<sup>2</sup>Department of Social and Cultural Ecology, Faculty of Humanities, Charles University, Prague, Czech Republic

<sup>3</sup>Leibniz Institute of Ecological Urban and Regional Development, Dresden, Germany

### I. INTRODUCTION

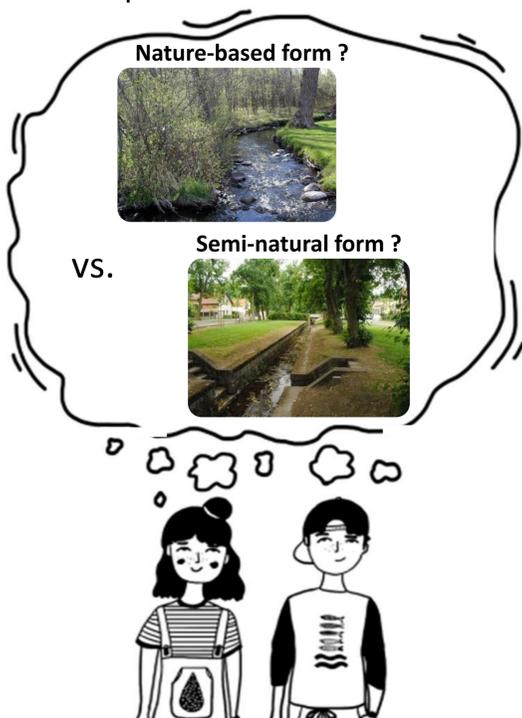
Natural resources on urban level are represented by green and blue infrastructure (GBI). GBI provides a wide range of ecosystem services (ES) which contribute to improvements in residents' well-being and overall quality of life. Recent studies showed that city dwellers are aware of some of the benefits provided by GBI and that they are willing to pay for building, extending and maintenance of these elements.

GBI elements take different forms – from genuine nature form over nature-based form to semi-natural form. Individual forms of GBI elements differ not only in aesthetics, but also in the amount and quality of ES provided. It has been shown that nature and nature-based form of streams or parks provide ecosystem services to a greater extent than other forms of these GBI elements – especially when it comes to water regulation, habitat creation or recreation. Preferences regarding individual forms of GBI elements have not been systematically studied before.

This poster focuses on preferences in three cities: Liberec and Děčín (both in the Czech Republic) and Dresden (in Germany). We build on previous research, which explored the preferences related to GBI elements in these cities. In all three cities residents preferred the most the presence of urban forests, public parks, rivers and streams or lakes (always at least one third of the respondents).

The aim of this poster is the determination and cross-border comparison of preferences related to different forms of elements of green and blue infrastructure and their specific form by answering the following questions:

- (1) Which are the most preferred forms of GBI elements among city residents?
- (2) Do residents' preferences differ in the selected cities?



### II. METHODS

An image-assisted **discrete choice experiment** was designed and used to reveal people's preferences for various form of local GBI elements and preferences about the presence or lack of various types of facilities that are commonly used in public greenery.

The respondents were introduced to the topic and presented with 9 pairs of hypothetical parks (see example to the right). The parks were described by 4 attributes: (i) form of the park, (ii) form of the stream, (iii) park infrastructure, (iv) annual financial contribution. The task of the respondents was to choose the park they preferred or to "opt-out" and choose neither. Statistical software was used to evaluate the data using logit model and to discover what forms of elements people enjoy the most.



### IV. RESULTS

The results of the logit model (see the schemes to the right) showed that residents' preferences for nature-based form were significantly higher than for semi-natural form of elements (for both parks and streams in all cities). Willingness to pay for nature-based form is higher by dozens of Euro. The presented results are only relative – they do not show the willingness to pay in absolute terms, only what the differences between specific forms are.

- The most notable differences among the cities include the fact that people in Děčín prefer urban garden over semi-natural park. Additionally, nature-based park seems to be significantly ahead of both semi-natural park and urban garden in Děčín and Dresden (in the sense of relative differences in willingness to pay).
- On the other hand the results for form of streams are very similar in all cities. Nature-based form is the most preferred one. Interestingly, stream running in a pipeline was perceived better than semi-natural stream.
- Results for park infrastructure follow economic logic (more is better), but the results are not statistically significant.

### V. CONCLUSION

The majority of the residents prefers nature-based forms of elements in all three cities. Although respondents from all three cities prefer natural form of GBI elements, it is clear that at least some semi-natural greenery is needed to satisfy the broader society. The findings are significant for urban planners and decision-makers when planning new GBI elements or revitalization of the current ones. According to our results, decision makers' fear of social acceptability of cities re-naturalization is irrelevant.

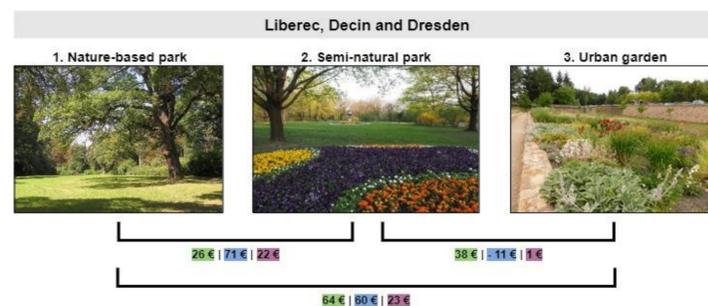
Interested in further details or in research cooperation? Contact us! ([louda@ieep.cz](mailto:louda@ieep.cz))



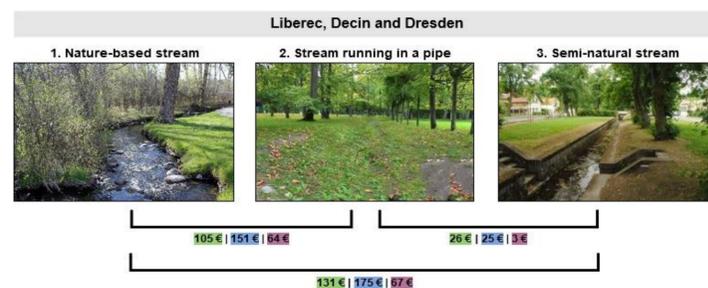
### III. STUDY AREAS

A choice experiment in three different cities was carried out. Table below shows the main differences and basic characteristics of all cities: Liberec, Děčín and Dresden.

City	Liberec (CZ)	Děčín (CZ)	Dresden (DE)
Area (km <sup>2</sup> )	106.1	117.7	328.8
Population	103,853	48,809	543,825
Number of respondents	209	209	297



Legend: values are shown for Liberec, Děčín and Dresden.



Acknowledgement: We are grateful for the financial support to the projects "Smart City – Smart Region – Smart Community" (from a grant from the Operational Programme Research, Development and Education of the Czech Republic – Grant no. CZ.02.1.01/0.0/0.0/17\_048/0007435) and „The value of ecosystem services, biodiversity and blue-green infrastructures in cities, exemplified by Dresden, Liberec and Děčín (BIDELIN)" (supported by the Cooperation Programme for the Promotion of Cross-border Cooperation between the Free State of Saxony and the Czech Republic 2014-2020).