A hands-on Evaluation of the Environmental Impact and Efficiency of Urban Nature-based Solutions

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Abstract Within a context of climate change urban green interventions are set forward as a solution to mitigate possible negative effects linked to increased occurrences urban flooding, heat waves and drought, loss of biodiversity, etc.

The increased implementation of these urban green interventions, often also called blue-green infrastructure (BGI) or nature-based solutions (NbS), also brings a demand regarding the efficiency and mitigating impact these interventions/solutions can have in an urban context.

Within the frame of the GREEN-INC project (https://green-inc.eu/) an interdisciplinary team (POLITO and VUB) has developed a monitoring and evaluation framework that helps to measure the performance of Inclusive Climate Actions, including a broad range of urban green interventions/nature-based solutions. The framework consists of several general Key Performance Indicators (KPI) based on desk research, and has been verified in stakeholder workshops in three partner cities with local partners (Brussels, Skelleftea, Turin). These workshops have resulted in additional 'context-specific' KPIs that have been added for each city.

In this contribution we focus on the selected environmental KPIs, strongly related to ecosystem services covering water (runoff production and re-use), health (air quality and thermal comfort), biodiversity (number of species and ecological connectivity) and environmental quality (soil and carbon sequestration). The main aim is that these KPI can be used to evaluate the efficiency and environmental impact of NbS for each of these different aspects, after implementation or even during the design phase, for of by city administrations.

For each of the environmental KPI a detailed hands-on approach is described based on available (open data) or data to be collected during the evaluation process, enabling a mostly quantitative and reproducible approach to evaluate the environmental impact of a NbS. As an example, the 'biodiversity - number of species' KPI is assessed using an existing App (iNaturalist). Apart from administrations or other organisations responsible for the data collected (in space and time), also citizens can be invited to engage to actively contribute. As such a 'monitoring & evaluation' template has been developed for each KPI , filling the need for a reproducible approach to evaluate the effectivity and impact of selected urban green interventions (such as NbS).