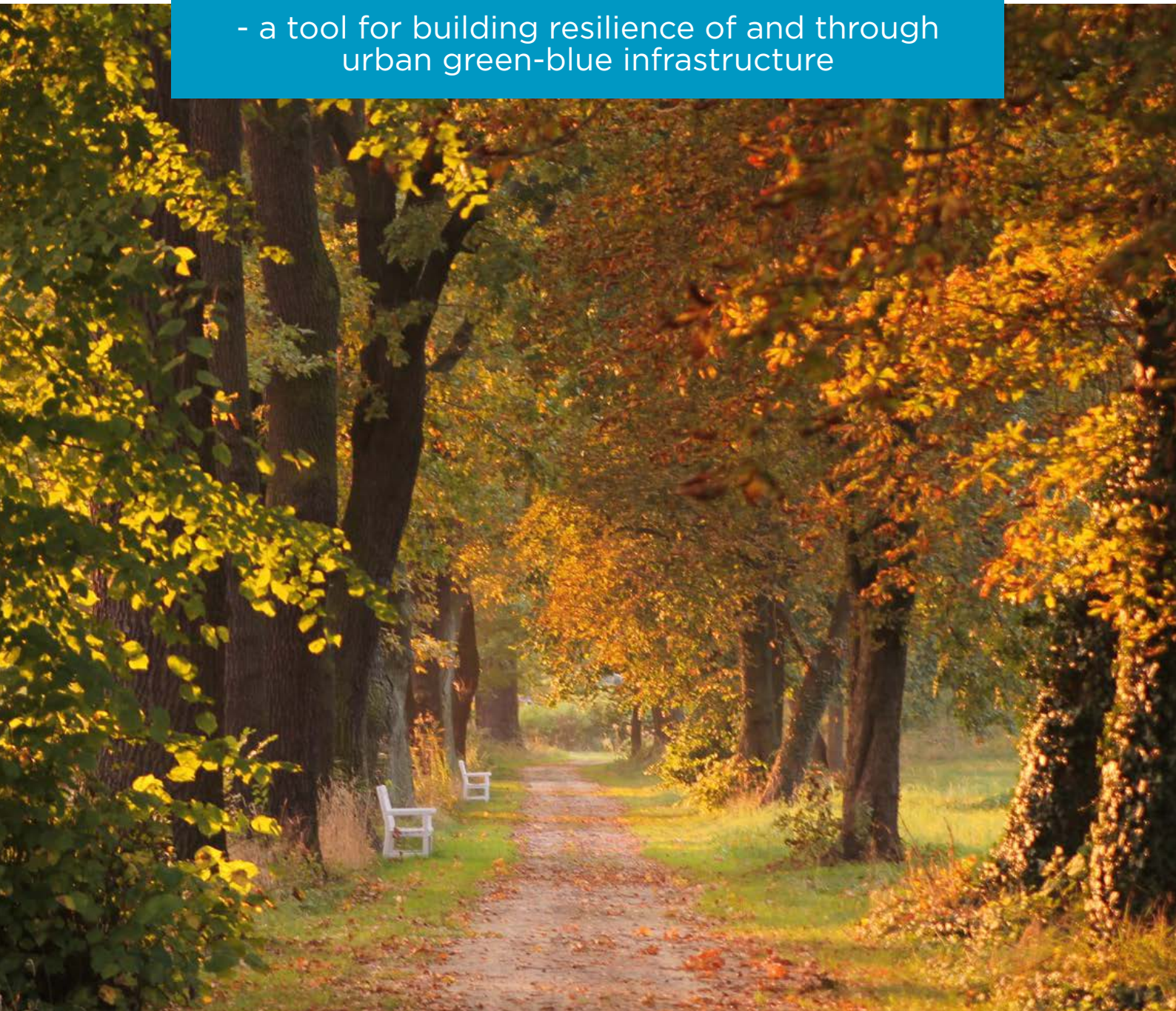




Participatory resilience assessment

- a tool for building resilience of and through urban green-blue infrastructure



The ENABLE project brings together a diverse, multi-disciplinary group of partners from North, South, West and Central Europe and North America to investigate how to unlock the full potential of GBI.

It will test possible GBI solutions to urban challenges in the metropolitan regions of Halle, Barcelona, Łódź, Stockholm and Oslo, while also exchanging with the city of New York.

Urban green and blue infrastructure is a critical ingredient for helping cities adapt to climate change – to reduce flood risk and heat stress – and to offer a place for residents' recreation and other social purposes. However, climate change, urbanisation and reorganisation of their management put the natural and semi-natural areas that provide these benefits under pressure. Knowledge of how the green and blue infrastructure and its

benefits are affected should inform decision making, policies, plans and management to ensure that urban residents can continue to enjoy the benefits of green and blue infrastructure in the future. A participatory resilience assessment is a useful tool for understanding the drivers of change and their impact on green and blue infrastructure and the availability of benefits, as well as for building local knowledge and agency to inform future actions.

What is resilience?

A resilient system can absorb or respond to stressors and disturbances without losing its essential structures and functions and without impacts on the benefits it provides (Resilience Alliance, 2010). An illustrative example is the human body, which is excellent in adapting to different contexts and situations. To build resilience, we need to first define what should be made resilient, for what purpose and to which changes, as well as the location and timescales being considered (Sellberg et al., 2017). Green and blue infrastructure can be framed in different ways, but if the focus is on human wellbeing then what needs to be resilient is the flow of benefits from the green and blue infrastructure.

Actions for building resilience – the capacity to handle change – can focus on the physical landscape, actors, institutional processes, knowledge

and capacities, or other parts of the system. A diversity of 'components' and redundant options for how they can be combined to achieve different outcomes helps to make sure that functions can be sustained despite pressures. A strong contributing factor to resilience is the capacity to adapt governance arrangements and active management to changing circumstances, as is having decision-making institutions at different scales. Resilience building involves learning and building a shared understanding of the connections and feedbacks between components of the system. To do this, it is important to make sure that stakeholders – and all urban residents have a stake in urban quality of life – can join their knowledge to the overall understanding of the system and participate in decision making (Stockholm Resilience Centre, 2016).

What is a participatory resilience assessment?

A resilience assessment helps stakeholders to understand how the biophysical and built up landscape, resource users and governance arrangements and processes are interconnected. This complexity defines how the system works. Specifically, it is important to understand the interactions and feedbacks between these system components, and how both external and internal drivers of change affect the system. This understanding informs the assessment of how the system will respond to scenarios of future change. It forms the basis for guiding future actions to ensure the system continues to function and thus sustain the flow of benefits to stakeholders.

The stakeholders are vitally important as experts about the local area, in what ways they benefit from green and blue infrastructure and what the most immediate challenges are (Tengö et al. 2014). Therefore, it is important to carry out the resilience assessment together with the stakeholders to ensure that all this knowledge is captured and that the assessment will provide useful outcomes for the stewardship and governance that support resilience building. A good guide is the Wayfinder platform, which provides a scientifically grounded guide to how to initiate and run a participatory resilience assessment process (<https://wayfinder.earth/>).



Why carry out a participatory resilience assessment for green and blue infrastructure?

Green and blue infrastructure in cities is critical for helping cities mitigate and adapt to climate change and support biodiversity, while offering recreation, nature experiences and many other benefits that are often highly valuable for human wellbeing. It is also, in many cities, under heavy pressure from ongoing local, regional and global changes. Green and blue spaces are often decreasing in size while at the same time expected to provide benefits for increasingly diverse interests. There are also challenges with their management – responsibilities are divided between sectors and governance levels with insufficient coordination among them – combined with declining public sector capacity to implement policy intentions.

A participatory resilience assessment helps deepen stakeholders' understanding of how the green and blue infrastructure works within its broader urban context. This shared understanding is built gradually through a series of workshops and is used as the starting point for identifying ways to secure a continued provision of benefits. The assessment develops a multiple evidence base (Tengö et al. 2014) for resilience-building actions, including available knowledge about ongoing and future changes, the character and values of local green and blue infrastructure and different options for maintaining and enhancing those values. The outcome is a set of identified strategies and actions for navigating changes and moving the system towards the stakeholders' joint target vision.



How to carry out a participatory resilience assessment?

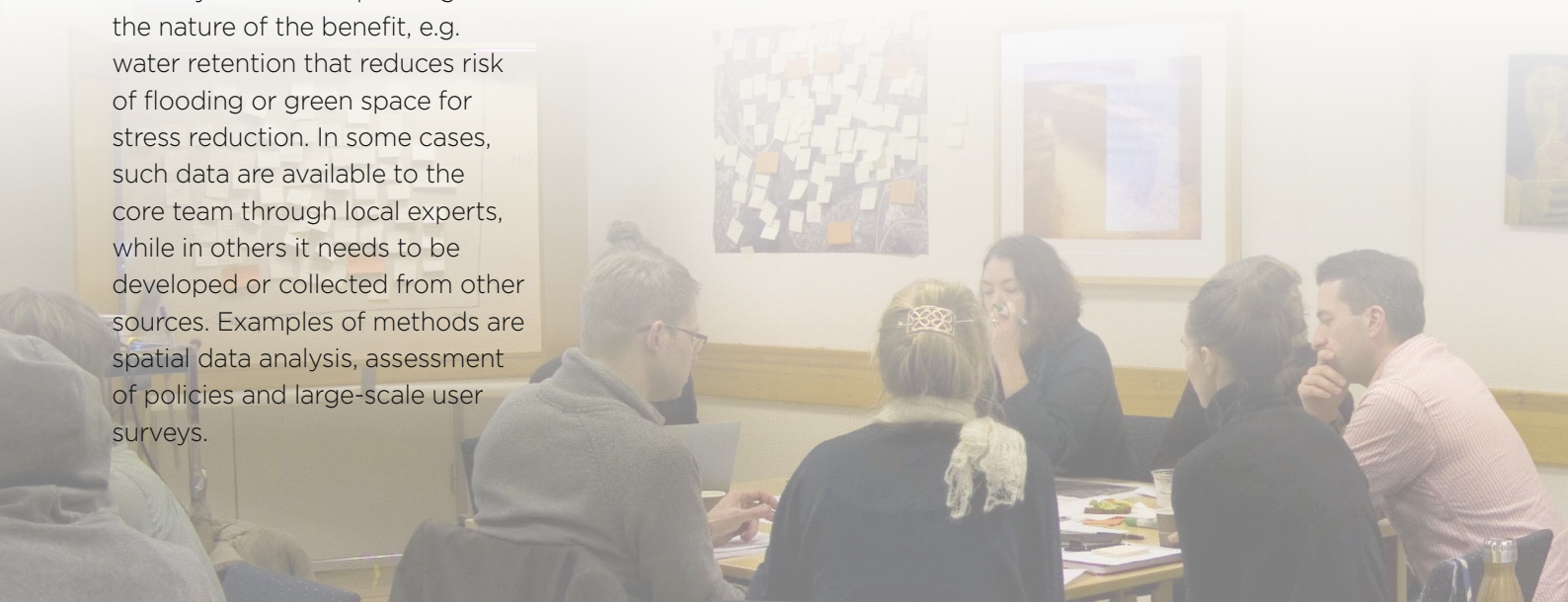
Preconditions for a successful assessment are that the initiators (e.g. researchers, strategists, consultants, NGOs) have the skills to guide the process and help develop potential outcomes, and that there is a clear mandate and financial support for running the process. Usually, a small group of people form a core team (Sellberg et al. 2015, 2017) that will be involved throughout the phases of the assessment and ensure that the process is locally grounded.



The **first phase** is to define the boundaries of the system of interest and complete an initial systems analysis. Urban green-blue infrastructure systems are made up of the physical green/blue spaces, the other elements of the surrounding landscape, the people that benefit from the green-blue infrastructure, and the processes that enable people's access to these benefits. Therefore, it is important to build an understanding of the green and blue infrastructure system as embedded in an urban – or wider landscape – context. This includes answering questions like what are the supply of and demand for benefits? On the demand side, this means understanding how people interact with and relate to these spaces, and what benefits are used and how. These interactions are very different depending on the nature of the benefit, e.g. water retention that reduces risk of flooding or green space for stress reduction. In some cases, such data are available to the core team through local experts, while in others it needs to be developed or collected from other sources. Examples of methods are spatial data analysis, assessment of policies and large-scale user surveys.

The **second phase** is to identify the stakeholders who need to be involved in the participatory assessment. Stakeholders are people who on a professional or voluntary basis have a connection to and/or an impact on the place, the benefits or other beneficiaries. Stakeholders can include, for example, users, managers, planners, decision-makers, land owners, neighbours or NGOs. Special care needs to be taken to invite stakeholders who are typically excluded from discussions about the green-blue infrastructure and overall urban development. Stakeholders can be identified from the initial system analysis in step 1, or by asking already identified local participants about other actors that should be included.

The **third phase** includes a series of participatory workshops built around the three steps of the participatory resilience assessment: a) develop a joint understanding of the system (including its components and their interrelations) and how it changes; b) assess the resilience of its core functions; and c) identify strategies to strengthen this resilience. General guidance for the design of the workshops and the questions to ask can be found in the Resilience Handbook (Resilience Alliance, 2010). However, it is of utmost importance that the workshops are carefully tailored to fit the local context and explicitly designed to be interesting and engaging for participants.



While the number and exact design of workshops need to be adapted to the local context, the assessment always include the following sets of questions. Each set builds on and further develops the outcomes of the previous one.

What should be resilient?

This question supports the framing of the assessment by defining the vision and goals for the process, i.e. to decide what should be resilient. The vision and goals are based on the different knowledge that the core team and the participants bring to the discussions. The visions and goals decided on are not 'set'; they will be continuously refined throughout the workshop process. The answer to this question needs to capture what the stakeholders see as valued assets of the system (including the benefits that green-blue infrastructure provides and the preconditions for those benefits), as well as the key system components and interactions that are essential for these assets at different temporal and spatial scales.

To what changes should the system be resilient?

This question focuses on change. It considers the internal and external factors that cause change in the system, and the pace and geographical scale of change. It therefore supports the identification and description of the stressors and pressures to which the system needs to be resilient. The factors may include demographic, economic, organisational, technological or environmental changes. Often this discussion starts by considering historical events, depicting how the system has changed over time until the present. The identified changes in the system are then related to the valued assets.

How to build resilience?

Based on the acquired understanding of the system, the first task for this question is to explore the future by developing scenarios. How will the system change, what are important threats and possibilities? For example, what will the supply and need for benefits from the green-blue infrastructure look like in the future compared to today? What different desirable and undesirable futures can we imagine? The second task is to reiterate the initially defined vision and goals for the system based on the newly developed understanding. What would resilient green-blue infrastructure look like in the future? The final task is to identify different ways to reach that desired system and to identify what actions to prioritise in order to start building resilience. What actions should be taken, by whom, where, at what level and when?

At the centre of the workshops are small group exercises and tasks where people discuss their preferences and share knowledge to complete the exercises for each session. However, the group work can be complemented with individual exercises in cases where it is important to avoid influence by others and capture the full range of contrasting experiences and opinions as well as consensus. Workshop exercises can include mapping valued assets; ranking valued assets, changes or actions in the area by importance; mapping impacts on valued assets for the defined scenarios;

or linking proposed measures to a diagram of relevant actors. Large sheets, stickers, maps and post-its are used to capture outcomes of discussions, as well as joint presentations and discussions with all the smaller groups. Background material provided in advance allows participants to enter the workshops with a sufficient foundation of knowledge. Visual prompts and diagrams are often of help when explaining concepts and exercises during the workshops. The workshops must be carefully designed and facilitated based on the questions to be addressed, as well as the need to ensure that all participants are included, that there are clear protocols for data management and sharing, and that group dynamics and potential disagreements are handled. Hence, it is essential for a successful process that the core team has competence and experience in process design, facilitation and communication, and that these different roles are divided among the core team members.

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The **fourth phase** is to communicate the results of the participatory resilience assessment as defined through the workshop process. The results are provided to relevant actors involved in the issues identified, and can be discussed through multi-stakeholder forums.

Example: Participatory Resilience Assessment in the Flaten landscape, southeast Stockholm



ENABLE has carried out a participatory resilience assessment in the Flaten landscape of Stockholm, Sweden. The system was delineated specifically for the assessment and was not based on any existing boundaries. It includes a larger green space under formal protection as a nature reserve, containing mixed forests, former agricultural lands, urban gardening and a lake, and its surroundings, which

are made up of rather dispersed urban areas that includes many different kinds of green spaces. The green-blue infrastructure in the landscape hence includes both the nature reserve and the green spaces between buildings. The Flaten landscape is rapidly densifying; more than 2000 new dwellings will be added.



The participatory resilience assessment was conducted following the steps outlined previously. As a proxy for valued assets and benefits from green-blue infrastructure, the core team identified outdoor recreational activities as a term or conceptualisation that the participants could relate to. Identified activities included urban gardening, everyday walking, nature education, outdoor swimming, sunbathing, fishing and socialising. These activities were assessed as sensitive to several external and internal drivers of change, including climate change, increasing population, exploitation, organisational changes, political shifts



and prioritisations of public financial resources. Several future scenarios were discussed, which differed in who has access to the benefits from the green-blue infrastructure in the landscape, the degree of impact from environmental changes, how the landscape governance is organised and how the urbanisation process unfolds in terms of physical changes as well as in land tenure. A joint vision and interim goals were formulated that formed the basis for discussing actions in relation to the current system, in terms of what to keep, adapt, transform or remove in the physical landscape and its institutions.

The implementation of the participatory resilience assessment revealed several key lessons for developing an effective process.

- The purpose of the participatory resilience assessment should be clear to all participants from the outset. This makes it easier for participants to contribute effectively and increases the likelihood that they remain engaged in the process. A decision maker with responsibility for the system being committed to the process further increases engagement – participants understand how the resulting information will be used and can feel that they are contributing to positive change.
- Focusing on a human perspective of how people benefit from the system makes discussions more accessible to participants. However, care should be taken to ensure that the need for biodiversity and functioning ecosystems for green and blue infrastructure is not neglected.
- Instructions for exercises need to be clear, avoiding jargon and complex concepts – the

exercises should be designed such that they are easy to grasp so that participants can quickly engage with the ideas. The agenda should be planned with lots of time for discussion during the exercises and with enough breaks that participants feel refreshed and can come up with new ideas, as well as informally interact.

- Ensuring that the right mix of people attend the workshops is key. Many participants benefitted from making new connections and being exposed to new ideas, as well as by learning from others' experiences. However, careful design and facilitation is required to ensure that all perspectives are included and that the group stays on task.

Planning an effective participatory resilience assessment is challenging. But when done well, it has enormous potential to engage new actors in building resilience, identify innovative solutions and ultimately ensure that people and biodiversity can continue to benefit from green-blue infrastructure in our future cities.



References

- Resilience Alliance. 2010. Assessing resilience in social-ecological systems: Workbook for practitioners. Revised version 2.0. Available from: <https://www.resalliance.org/resilience-assessment>
- Sellberg, M. M., Wilkinson, C., & Peterson, G. D. 2015. Resilience assessment: A useful approach to navigate urban sustainability challenges. *Ecology and Society*, 20(1). <https://doi.org/10.5751/ES-07258-200143>
- Sellberg, M.M., Borgström, S.T., Nortström, A.V. and Peterson, G.D., 2017. Improving participatory resilience assessment by cross-fertilising the Resilience Alliance and Transition Movement approaches. *Ecology and Society*, 22(1): 28.
- Stockholm Resilience Centre. 2016. Applying resilience thinking. Seven principles for building resilience in social-ecological systems. [online] URL: http://applyingresilience.org/wp-content/uploads/sites/2/2016/04/Applying_resilience_thinking.pdf
- Tengö, M., Brondizio, E. S., Elmqvist, T., Malmer, P., & Spierenburg, M. 2014. Connecting Diverse Knowledge Systems for Enhanced Ecosystem Governance: The Multiple Evidence Base Approach. *Ambio*, 43(5), 579–591.
- Wayfinder online platform. <https://wayfinder.earth/>

Project partners

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Sustainability Science for Biosphere Stewardship



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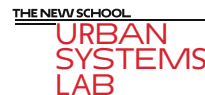


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Project Duration: January 2017 – December 2019

www.projectenable.eu

This research was funded through the 2015-2016 BiodivERsA COFUND call for research proposals, with the following national funders:



The Swedish Research Council for Environment, Agricultural Sciences, and Spatial Planning
Swedish Environmental Protection Agency
German aeronautics and space research centre, Germany
National Science Centre, Poland
The Research Council of Norway
Spanish Ministry of Economy and Competitiveness

