



A photograph of a canal scene. In the foreground, several wooden planters filled with green plants are floating on the water. The planters are labeled with numbers: 21, 23, 24, and 25. In the background, there's a line of birch trees on a grassy bank under a blue sky with white clouds. A tall industrial chimney is visible on the right side of the image.

NATURE-BASED SOLUTIONS BEST PRACTICES BOOKLET



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AUTHORS

RYAN TITLEY, ERRIN

HEIDI JOHANSSON, ERRIN

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UNALAB IN A NUTSHELL

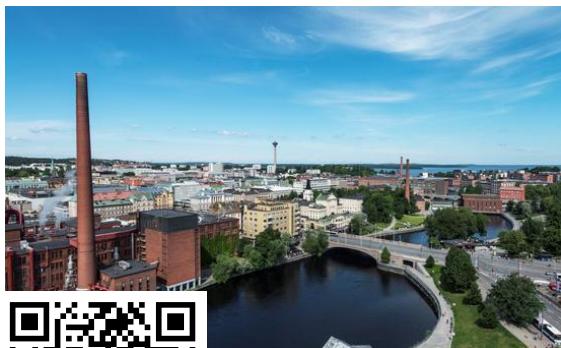
The EU-funded UNaLab project is contributing to the development of smarter, more inclusive, more resilient and more sustainable urban communities through the implementation of nature-based solutions, which are co-created with and for local stakeholders and citizens.

Our three front-runner cities - Eindhoven, Tampere and Genova - are, through the establishment of Urban Living Lab demonstration areas, experimenting, demonstrating and evaluating a range of different nature-based solutions (NBS) addressing climate- and water-related urban challenges. The front-runner cities actively collaborate and share their experiences with the project's seven follower cities - Stavanger, Prague, Castellón de la Plana, Cannes, Başakşehir, Hong Kong and Buenos Aires - as well as the two observers - Guangzhou and the Brazilian Network of Smart Cities.

This **Nature-based Solutions Best Practices Booklet** aims to present experiences and highlight best practices and recommendations deriving from the UNaLab project's work. It is mainly based on the UNaLab front-runner cities' experiences and builds on handbooks, reports and tools that have been conceptualised and developed as part of the project.

The aim of the booklet is to support present and future NBS planners, designers, implementers as well as end-users in the adoption of NBS by highlighting specific experiences and recommendations that can be useful in the different phases of an NBS project. The booklet consists of four main sections (1) Stakeholder Engagement, (2) Governance (3) Financing Nature-based Solutions and (4) Impact Monitoring and Evaluation.

Tampere



It is estimated that rainfall in Finland will increase by 25% in the coming years due to climate change. Therefore, Tampere is facing critical issues related to **flooding and storm water management**. The two prime NBS demonstration areas in the city are furthermore transforming into dense urban areas that will see rapid population growth and related challenges, including **water pollution** and **reduced biodiversity**.

Eindhoven



Eindhoven is facing serious challenges due to a rapidly growing population, which is estimated to increase from 220,000 in 2014 to 300,000 by 2030. Critical issues for the city, which are exacerbated by climate change, include **flooding, urban heat stress, air pollution**, and **lower quality of life**. The rapid urbanisation in recent years has also led to the **disappearance of blue zones**, which is having detrimental effects on the urban environment.

Genova



Genova is affected by **frequent and severe flooding** which has resulted in significant destruction of certain areas in the city in the past, primarily linked to intense rainfall in a highly urbanised landscape. The city faces numerous environmental challenges related to extreme weather conditions such as **water management issues, heat stress** as well as **water and air pollution**.

STAKEHOLDER ENGAGEMENT

Awareness-raising activities to gain public acceptance

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Multi-disciplinary collaboration throughout the process

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Informal networks for sharing information and developing new ideas

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Stakeholder engagement is a crucial aspect in the conception and implementation of any NBS project. Numerous aspects, such as the co-development of solid monitoring strategies and impact assessment frameworks, rely on the diversity of actors involved, including local stakeholders and project partners. Each UNaLab front-runner city co-identified the Key Performance Indicators (KPIs) and Key Impact Indicators (KIs) based on the local challenges and needs in a series of group sessions. These sessions shaped the common understanding of challenges and their relative importance, as well as the expected outcomes of planned NBS actions in each city. Stakeholders further participated in the selection of appropriate monitoring protocols and the development of local co-management activities, such as the engagement of students and the establishment of local Communities of Practice.

The development of a shared vision and common values via facilitated cooperation is considered a crucial first step in building long-term trust among the stakeholders involved in all stages of a project, from planning and implementation to maintenance and monitoring. The increased commitment of participants and active dissemination of outcomes to a wider audience builds **strong and enduring networks**, while contributing to **new and innovative approaches**. All three UNaLab front-runner cities concluded that the involvement of stakeholders who share a common vision amplified social acceptance in the community and strengthened the role of citizens in designing and monitoring NBS.

AWAWARENESS-RAISING ACTIVITIES TO GAIN PUBLIC ACCEPTANCE

Awareness-raising and dissemination activities are crucial to implement successful NBS projects. Increased public awareness of local stakeholders and citizens can lead to increased acceptance of and commitment for further projects. Awareness-raising activities can take many different shapes and forms, from presentations, workshops and conferences, to using social media platforms and websites to spotlight NBS and increase the level of knowledge in the public. Pilots may also open for the public and organise information walks and events.



UNALAB IN PRACTICE

INTERESTED IN LEARNING MORE?

Read about Tampere's involvement of school children in water monitoring activities here.



In order to spread awareness of the existing NBS in the city, Eindhoven developed an **Innovation Handbook**, which showcased the best practices regarding the development of NBS.

This initiative generated a number of important outcomes, including:

- allowing key stakeholders to develop a collective definition of NBS and support the process of education and awareness-raising;
- providing incentives for local businesses to use NBS to improve their reputation in the city;
- providing municipal workers with a document they could use to spread awareness of NBS.

MULTI-DISCIPLINARY COLLABORATION THROUGHOUT THE PROCESS

In urban environments, the implementation of nature-based solutions requires a collaborative effort of various actors coming together with different interests, skills and competences. A joint effort of stakeholders both within and between different municipal units, but also with actors with expertise beyond the municipal administration, including citizens, higher education institutions and companies, at all stages of an NBS project is pivotal to its long-term success.

Nature-based solutions naturally open up opportunities for **multidisciplinary cooperation**, however, it is important to bear in mind that such approaches call for careful **planning and facilitation**, which in turn requires appropriate **time and resources**. Collaboration across departments within a particular municipality may take different forms, from cooperation in more informal, ad-hoc teams, to regular working group meetings that follow common procedures and/ or cross-cutting programmes, based on strategic objectives. Cities should adopt the organisational structures and ways of working that best reflect their specific context and individual needs.



UNALAB IN PRACTICE

Cities increasingly turn to their local stakeholders, notably citizens, universities and companies, to co-create nature-based solutions in response to their most pressing environmental challenges. In Tampere, **learning together** has been at the core of the city's journey towards co-creating nature-based solutions with all stakeholders. In the UNaLab project, learning together underpinned the crucial first step of creating a common vision and enabled participants to meet on an equal footing. It created an open space for discussing the complexity of nature-based solutions and facilitated mutual learning opportunities, leading to increased commitment and success.

RECOMMENDATIONS FROM THE UNALAB PROJECT

Multidisciplinary collaboration between all stakeholders involved throughout the lifetime of an NBS project is crucial to ensuring its **long-term success and sustainability**.

To support the smooth running of such collaborative approaches to the benefit of all stakeholders involved, it is important that municipalities plan ahead carefully, allowing for **adequate time** and dedicating **sufficient resources** to the collaboration from the outset of the project. Further, municipalities must reflect upon the interests of the different actors involved from the very beginning. This is linked to the need to ensure a **clear division of roles, responsibilities and tasks** of each stakeholder involved. While **openness and the exchange of information** should be encouraged between the different stakeholders engaged in the different phases of the NBS project, it is equally crucial to put in place **mitigation measures and dispute resolution processes** in response to potential disagreements that might occur between the involved actors.



INFORMAL NETWORKS FOR SHARING INFORMATION AND DEVELOPING NEW IDEAS

Informal networks play an important role in the adoption of nature-based solutions in cities. These networks are effective in bringing together actors from different municipal departments and sectors in the city to share information, develop new ideas and design innovative approaches.

The establishment of informal networks – and their empowerment – is not only key to connect stakeholders from different institutional backgrounds, promote cross-cutting actions and establish trust between them, but also to **boost inclusivity, diversity** and open the door towards a more diverse set of stakeholders.



UNALAB IN PRACTICE

INTERESTED IN LEARNING MORE?

Find the Co-creation Workshops Report here.



The **UNaLab co-creation workshops** in Eindhoven prompted the participating experts to setting up a dedicated **Community of Practice (CoP)** for the adoption of nature-based solutions in the city. Eindhoven's CoP is a group of experts from various fields and disciplines, who come together regularly to exchange on successes and possible hurdles, and test new and innovative ideas in a **safe, inclusive and open environment**. These meetings have been instrumental in shaping Eindhoven's approach towards NBS and helped frame many related aspects and their implementation.

RECOMMENDATIONS FROM THE UNALAB PROJECT

It is important to devote adequate time and resources to defining the right structures that underpin stakeholder engagement activities at the outset of an NBS project. Importantly, these structures should reflect the specific needs on the ground and develop in line with ongoing processes. At the same time, **continuous evaluation** and the flexibility to allow for the **refining and adaptation of approaches** in the course of the project is needed.

Specifically, a municipality should consider allowing their staff to dedicate part of their working hours to the topic, thus supporting the creation of **informal networks**. This is closely linked to the creation of **supportive environments** where all involved actors are encouraged to introduce new topics, ideas and challenges. Furthermore, it is important that not just existing stakeholders are involved in the process, but that it remains **open to new actors**. In particular, active outreach to groups that are not yet involved and who may have diverging viewpoints and perceptions is important. The diversity of actors involved is a pre-requisite of success.



FINANCING NATURE-BASED SOLUTIONS

Innovative financing mechanisms for the implementation of NBS
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Nature-based Solutions Business Model Canvas
Page 14

Sustainable and long-term financing models and solutions are another important factor that determines the success of NBS. In order for NBS to reach their full potential in terms of both environmental and social benefits, their financial continuity needs to be assured in the long-term. Due to the nature of NBS interventions, which are primarily linked to public spaces, a large number of existing funding models tend to follow a top-down approach and rely heavily on **public funding support**.

While there are various challenges that may impact the decision of private companies to invest in NBS, collaboration with the **private sector** should not be disregarded when it comes to developing long-term financing solutions. It may increase efficiency and bring additional resources for NBS implementation and mainstreaming, which makes it a worthwhile endeavour. Naturally, this is strongly linked to the local context and the project's specific needs. In this context, it is equally important that the relevant city/regional authority plays an active role in setting up **targeted financial and legal incentives**, such as green bonds, to boost the participation of the private sector. This should go hand in hand with the deployment of **policy tools** at their disposal, including the introduction of guidelines and incorporating NBS in new developments.

In the UNaLab front-runner cities, several innovative financing solutions have been used, including the Nature-based Solutions Business Model Canvas, which is further explained on page 14.

INNOVATIVE FINANCING MECHANISMS FOR THE IMPLEMENTATION OF NBS

Cities need to urgently adopt **new financing mechanisms and funding models** to successfully upscale NBS, in particular encouraging the **engagement of the private sector**. The introduction of **financial and legal incentives**, such as tax benefits or development rights, as well as the development of a solid **Business Model Canvas**, can be effective tools. These can help bridge silos, broaden the value proposition, develop long-term financing plans, and facilitate capacity building.



UNALAB IN PRACTICE

In 2019, the City of Tampere launched a call for small-scale NBS projects by housing cooperatives and associations in the Vuores areas. Through the initiative, the city wanted to encourage citizens to take steps to plan and implement NBS that they find useful for their environment. Three proposals were awarded innovation vouchers worth up to €10,000 to plan and realise NBS.

The garden areas funded by the vouchers implemented trees and bushes, planter boxes for the residents to use, fruit trees and berry bushes, perennials and summer flowers, as well as areas to compost gardening waste and structures to harvest rain water for garden irrigation.

Incentives and market-based instruments are perceived as favourable option to create the necessary pull-factors and at the same time show the value that is being created through NBS.

INTERESTED IN LEARNING MORE?

Find out more about Tampere's use of innovation vouchers for NBS here.



NATURE-BASED SOLUTIONS BUSINESS MODEL CANVAS

Use the Nature-based Solutions Business Model Canvas to support the planning of NBS projects.

The Nature-based Solutions Business Model Canvas (**NBS BMC**) is a user-friendly tool that aims to capture the business model of a nature-based solution (NBS) in a visual format, supporting the initial planning phase of an NBS project and reducing the complexity of the business modelling activity.

The NBS Business Model Canvas supports NBS adopters in defining **communications strategies** to different stakeholder groups and **identifying new partners**. In addition, it aims to support users in exploring **new sources of finance** as well as ways of **broadening the value proposition** of their project. The possibility to effectively and immediately visualise all the relevant aspects as well as both internal and external dynamics included in a business model represents the major benefit of this method in the planning and assessment of an NBS project.

UNALAB IN PRACTICE

INTERESTED IN LEARNING MORE?

Find the report on Business Models and Financing Strategies here.



The NBS BMC has been tested on and adapted to the majority of NBS implemented in the three UNaLab front-runner cities: permeable surfaces, green urban areas, river restoration, green roofs and vertical greening, and water sensitive urban design measures. For each NBS, the BMC presents the list of key partners involved in the solution, the key activities needed to implement it, the key resources to fulfil the needs of the project, the value proposition, the stakeholders/beneficiaries, the costs divided in manufacturing, implementation and maintenance, as well as the financing models to be adopted.

RECOMMENDATIONS FROM THE UNALAB PROJECT

The NBS Business Model Canvas enables the identification and collection of key information around a nature-based solution, and supports the effective communication and dissemination of this information towards different types of stakeholders.

To ensure maximum impact of the NBS Business Model Canvas, the following aspects should be taken into consideration:

- shape the NBS BMC and adapt it to each solution analysed, using a tailored approach;
- examine the technical features of each NBS, clearly identifying the concrete value proposition, the conditions for implementation, the limitations and barriers, the stakeholders/beneficiaries, as well as the costs associated and possible financing options;
- involve all key actors by outlining the benefits of the NBS BMC, in order to facilitate the process of acquiring and sharing information.



GOVERNANCE

Embed nature-based solutions in existing plans and strategies

Page 17

The strategic integration of NBS as a concept into the DNA of the city is a crucial step in the process of including NBS as a standard in urban development.

Cities today are under significant pressure to reconfigure urban systems and structures to facilitate sustainable development while future-proofing themselves against the most pressing global and societal challenges. While urban development has had a clear top-down character in the past, cities are increasingly making the shift from 'Government' to 'Governance'. This means moving towards providing a certain governance 'context' to organise activities, in which external actors such as research institutions, universities, companies and local communities are playing an increasingly important role in the way cities are planned, built and managed. This also requires the setting up of the **right structures and processes**.

To ensure the long-term success of NBS as a concept in supporting positive urban transformation in a sustainable manner, the concept needs to be embraced as an integral part of **mainstream urban planning and wider development processes and practices**.

Across the UNaLab cities, there has been a common central challenge in transitioning beyond the piloting and experimentation phase of NBS to the concept of NBS being recognised and accepted as a standard in urban development. This clearly illustrates the need to consider NBS in the context of urban development practices more broadly. In this regard, the strategic integration of NBS as a concept into the DNA of the city is a crucial step in the process.

EMBED NATURE-BASED SOLUTIONS IN EXISTING PLANS AND STRATEGIES

Due to its inherent **action-oriented approach**, NBS can act as a catalyst for developing solutions to existing challenges and be relied upon as an efficient tool for achieving objectives expressed both within the broader framework of current or future strategies in local contexts. Therefore, rather than developing an individual strategy around NBS, there is significant potential to utilise NBS as a 'tool' to achieve the objectives highlighted in existing or future strategies.



Policy links:

- Obvious links to strategies such as Green/Blue Infrastructure; Climate Change Adaptation/Mitigation; Biodiversity; Water Management etc.
- Less obvious links to strategies such as Social Development; Smart City; Mobility; Energy etc.

INTERESTED IN LEARNING MORE?

Read the UNaLab Municipal Governance Guidelines here.



UNALAB IN PRACTICE

Tampere considered nature-based solutions as part of the strategy development leading to its **Carbon Neutral 2030 Programme**, which was specifically aimed at reducing emissions from urban planning, housing, mobility, energy and consumption. The city's climate actions were integrated into the **Carbon Neutral Tampere 2030 Roadmap**, which included 236 targeted actions across six priority themes: urban planning, mobility, construction, energy, consumption and nature. Many of these areas are naturally linked to nature-based solutions.

IMPACT MONITORING & EVALUATION

Consider purchasing monitoring services

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Monitoring plans for nature-based solutions

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The development of a credible and appropriate impact monitoring and evaluation plan is the very basis of effective NBS implementation. Furthermore, it is proven to contribute to evidence-based policymaking, support policy learning and facilitate flexible decision-making. Throughout the UNaLab project, monitoring proved to be a central aspect in the **collection and management of NBS performance data**. In addition, monitoring played a key role in changing the attitudes of local stakeholders and convincing them of the **added value of NBS and the potential impact** for their city.

Frequent monitoring detects problems and supports the diagnosis and resolution of issues.



CONSIDER PURCHASING MONITORING SERVICES

Impact evaluation is part of a broader agenda of evidence-based policy-making and is essential to building knowledge about the effectiveness of interventions by highlighting what does and does not work to achieve desired change.

Maintenance of online monitoring instruments needs special expertise, time, tools and chemicals, making it challenging to organise this as a part of a municipality's maintenance actions. Although online monitoring instruments are equipped with automatic cleansing systems, plenty of manual maintenance, calibration and sampling is needed. Therefore, it is recommended to purchase online monitoring as a service. For example in Tampere, the online water quality monitoring has been purchased as a service with a turnkey contract.



UNALAB IN PRACTICE

INTERESTED IN LEARNING MORE?

Check out the City Performance Monitor tool here.



The City Performance Monitor (CPM) is the performance analytics and monitoring tool used by the UNaLab project cities. It increases **stakeholder and citizen awareness** of urban conditions through an easy-to-understand representation of the effectiveness of the NBS implemented in the city. The CPM exploits the city's data sources - including Internet of Things sensor devices, open data platforms and legacy services - to obtain environmental measures and to calculate **indicators for the social, environmental and economic conditions** of the city, and the effectiveness of the implemented NBS in addressing these issues.

MONITORING PLANS FOR NATURE-BASED SOLUTIONS

The UNaLab front-runner cities co-developed solid monitoring processes and evaluation strategies in close collaboration with project partners as well as technical experts to facilitate the assessment of NBS performance and impact in a **cost-effective and evidence-based way**. The ICT platform and NBS monitoring and evaluation tools developed by the project support long-term NBS evaluation by enabling the automated collection of monitoring data for NBS impact assessment, while also allowing manual adaptation.



UNALAB IN PRACTICE

INTERESTED IN LEARNING MORE?

Learn more about performance and impact monitoring of NBS here.

The effectiveness of NBS implemented in front-runner cities have been monitored and evaluated using a defined suite of protocols to enable consistent collection and management of NBS performance data during and following the UNaLab project. **Monitoring and Evaluation (M&E) protocols** were established in co-operation with the co-identification of Key Performance Indicators (KPIs) and Key Impact Indicators (KIIs). M&E protocols included a comprehensive methodology for the routine measurement of key parameters and evaluation of NBS efficacy based on defined KPIs. The scope of the M&E protocol was two-fold in order to measure the performance of implemented NBS at the **project level** (i.e. demonstration areas) and **city level** (further scaling and replication inside city and region).



RECOMMENDATIONS FROM THE UNALAB PROJECT

A robust and comprehensive monitoring and evaluation process to monitor NBS outcomes is needed to detect and resolve issues in NBS implementation. Monitoring further provides important information for future planning, especially when it comes to replicating and scaling NBS more widely.

At the outset of an NBS project, it is important to define an appropriate **data management strategy**, including **data governance requirements** that clarify ownership of data, which is especially important in multi-stakeholder collaborations of different municipal units, as well as with external stakeholders. Furthermore, the division of concrete tasks and responsibilities for NBS monitoring should be clearly outlined during the planning stages to avoid any issues further down the line.

When it comes to the interpretation of data and evaluation of related monitoring outcomes, it is important to ensure appropriate baseline data and solid evaluation techniques, as well as in-depth expertise of the personnel involved. In this respect, it is also important to bear in mind that, generally speaking, challenges in the evaluation of monitoring outcomes tend to relate to poor or non-existent reference data, which is why monitoring and evaluation aspects should be embedded from the planning phase.



OTHER INTERESTING PRACTICES

IMPLEMENTATION OF NBS DEMONSTRATION SITES

Learn about the development and implementation of the Urban Living Lab NBS demonstration sites in the UNaLab frontrunner cities Tampere, Eindhoven and Genova.



GOVERNANCE INSIGHTS

Take part of some governance challenges and actions that the UNaLab cities have addressed.

SETTING UP URBAN LIVING LABS

Learn how to develop an Urban Living Lab by taking part of the learnings, research and practical experiences of the UNaLab project.



FROM ROADMAPPING INTO LOCAL PLANS

Learn how the UNaLab follower cities engaged different urban stakeholders to jointly develop ambitions and visions for the future, and co-create a roadmap of concrete NBS projects.





The UNaLab Consortium is comprised of 28 partners from 10 cities across Europe and beyond, including municipalities, research, business and industry. The UNaLab partner cities are committed to address climate - and water-related urban challenges with an innovative and citizen-driven approach. The UNaLab cities aim to develop smarter, more inclusive, more resilient and increasingly sustainable societies through innovative nature-based solutions.

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