



CLEVER
Cities

CLEVER Cities guidance on co-creating nature-based solutions

PART I - Defining the co-creation
framework and stakeholder engagement

Deliverable 1.1.5

Work Package	WP1
Dissemination Level	Public
Lead Partner	Politecnico di Milano
Due Date	30.11.18
Submission Date	30.11.18

Deliverable No.	1.1.5
Work Package	1, Task 1.1
Dissemination Level	Public
Author(s)	Eugenio Morello and Israa Mahmoud (Politecnico di Milano)
Co-author(s)	Sandra Cabrita Gulyurtlu, Victoria Boelman and Hannah Davis (Young Foundation)
Date	30/11/2018
File Name	CLEVER Cities Guidance on co-creating nature-based solutions: PART I - Defining the co-creation framework and stakeholder engagement
Status	Final
Reviewed by	ICLEI, TECNALIA, GLA, ECOLOGIC
Suggested citation	Morello, E; Mahmoud, I; Gulyurtlu, S; Boelman, V; Davis, H (2018). CLEVER Cities Guidance on co-creating nature-based solutions: PART I - Defining the co-creation framework and stakeholder engagement. Deliverable 1.1.5, CLEVER Cities, H2020 grant no. 776604.

This document has been prepared in the framework of the European project CLEVER Cities. This project has received funding from the European Union's Horizon 2020 innovation action programme under grant agreement no. 776604.

The sole responsibility for the content of this publication lies with the authors. It does not necessarily represent the opinion of the European Union. Neither the EASME nor the European Commission are responsible for any use that may be made of the information contained therein.

CONTACT:

Email: eugenio.morello@polimi.it ;
israa.mahmoud@polimi.it
 Website: www.clevercities.eu



This project has received funding from the European Union's Horizon 2020 innovation action programme under grant agreement no. 776604.

Contents

CLEVER Cities common acronyms	88
Executive Summary	89
How to use this guidance	92
CLEVER Cities co-creation framework	93
What distinguishes CLEVER Cities from other projects?	94
CLEVER Cities Organizational framework of Urban Innovation Partnership (UIP) and CLEVER Action Labs (CALs).....	95
CLEVER Cities co-creation pathway and stages of implementation	96
1. Co-creation for the successful implementation of nature-based solutions	97
1.1. What is co-creation?	100
1.2. Co-creation principles	101
1.3. Co-creation applied to nature-based solutions: what does it mean?	104
1.4. Co-creation in CLEVER Cities approach.....	108
2. Understanding the co-benefits of NBS.....	109
2.1. What are the co-benefits of nature-based solutions?.....	110
2.2. Co-benefits impact indicators in CLEVER Cities framework	110
3. Stakeholder engagement at all levels of implementation	112

3.1. Why is it important to map and engage stakeholders in co-creation and NBS?	113
3.2. How to identify and map stakeholders.....	115
3.3. How to engage stakeholders.....	118
3.4. Monitoring and evaluating stakeholder mapping and engagement	120
References	122
Annex 1: CLEVER Cities Glossary	128
Annex 2: Nature-based Solutions Catalogue.....	130

List of Figures

Figure 1: CLEVER Cities Infographic illustrating the Co-creation Pathway Structure	91
Figure 2: The organizational Framework of CLEVER Cities at the city local cluster: The Urban Innovation Partnership (UIP) and the Initiation of Clever Action Labs (CALs)	95
Figure 3: Diagram with the overall the UIP establishment and co-creation stages	96
Figure 4: Wind-rose too of verifying NBSs impact indicators at the centre of Health and well-being, sustainable economic prosperity, social cohesion and environmental justice, and citizen safety.....	111
Figure 5: Ecological model of stakeholder engagement.	112
Figure 6: Example of a stakeholder map produced by Groundwork and the Greater London Authority ..	117

List of Tables

Table 1: Different Levels of and approaches to stakeholder engagement	114
Table 2: Example table for defining stakeholder prioritisation criteria	118
Table 3: Evaluation table for stakeholder engagement Mock-up	121

CLEVER Cities common acronyms

Before starting the reading of this guidance, it is fundamental to create a shared glossary of terms. CLEVER Cities proposes a series of acronyms, which will be recurrent across the co-creation pathway.

CAL	CLEVER Action Labs
FR CITIES	Front Runner Cities
FE CITIES	Fellow Cities
UIP	Urban Innovation Partnership
NBS	Nature-based Solutions
EBA	Ecosystem Based Adaptation
ESS	Ecosystem Services
UGI	Urban Green Infrastructure
ULL	Urban Living Lab
WP	Work Package

Executive Summary

This deliverable is composed of Parts I and II. The first part contains three main chapters, outlining the CLEVER Cities co-creation framework, the implementation of the co-creation pathway on nature-based solutions, the understanding of co-benefits of nature-based solutions and stakeholder engagement at all levels of implementation along the process. Each chapter provides a series of definitions of key terms, main concepts and approaches to implementation within the CLEVER Cities project.

The second part of the guidance entails a series of steps and a toolkit for the implementation of the co-creation process. 16 steps are envisioned in a complete Co-creation pathway to support cities to achieve successful implementation of NBS. Each step is composed of one or more activities, which can be flexibly implemented by each city depending on their local contexts.

In this first version of the guidance, the contents and wording have been strictly tailored to CLEVER Front Runner Cities' needs, following the calendar of activities and deliverables defined by the project. Once the pathway has been tested in the pilot project sites, the guidance will be revised and translated into a more universally applicable language.

Scope and approach

This documentation is a practical guidance on how to establish and run co-creation laboratories according to the CLEVER Cities method. It highlights in detail the importance of nature-based solutions (NBS) and sets out concrete actions for the implementation of socially inclusive NBS in cities.

The guidance proposes a definitional framework for nature-based solutions, including a set of general principles for any nature-based solutions interventions. It also highlights the Co-creation Processes to include a Diversity of Stakeholders. Within this context, we have defined nature-based solutions as “actions to protect, sustainably manage and restore natural or modified ecosystems, which address societal challenges effectively and adaptively, while simultaneously providing human well-being and biodiversity benefits”. Within the CLEVER Cities program, cities will be applying these actions to localities within each city ranging from creating green corridors to regenerating residential areas and infrastructures. Thus, the stakeholders with a vested interest that influence the success and measures of solutions will range from the individuals and communities that will interact with the nature-based solutions to those who have decision-making power over the policies and infrastructures facilitating the implementation and maintenance of the nature-based solutions.

The guidance is intended to be flexibly adapted to different cities' contexts, inclusive to a diversity of stakeholders, open to all and transparent whatever their scale is. Possible adaptations hence, are widely compliant and feasible. The co-creation pathway planned in this guidance (see Part II) in the form of steps, a toolkit and templates is also flexible, with adaptable timing and even facultative to cities on-going processes based on equivalent experiences.

REMEMBER:

Urban Innovation Partnership (UIP) is a “city-wide or district-focused informal alliance of local and city authorities, community (groups), businesses, academics to promote the NBS for regeneration or urban transformation, facilitate and drive the co-creation process. More specifically, each UIP supports one or more CLEVER Action Labs (CAL)”.

CLEVER Action Labs (CAL) will co-design, co-implement and co-manage NBS interventions in the deprived districts starting from specific place-based NBS technologies as impulses.

Each UIP supports one or more CLEVER Action Labs (CAL) as alliances of locally involved actors specifically interested or relevant to realize place-based NBS interventions ‘on site’ with one specific CLEVER Stimulus.

Nature-based solutions are actions inspired by, supported by or copied from nature that aim to help societies address a variety of environmental, social and economic challenges in sustainable ways.

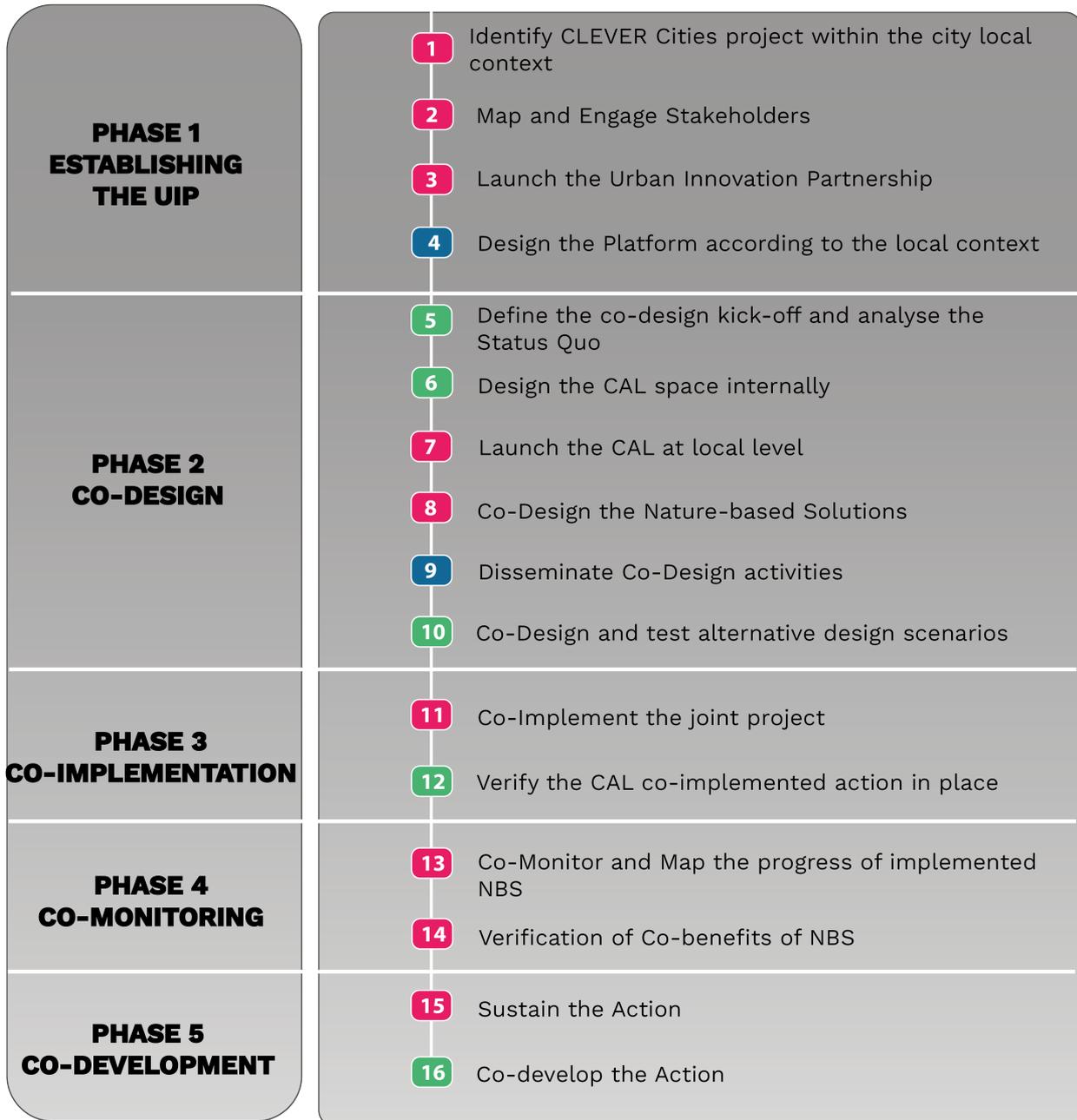


Figure 1: CLEVER Cities Infographic illustrating the Co-creation Pathway Structure

A colour distinction among the compulsory steps and optional ones is provided in forms of flags next to each requirement. This is intended to keep the pathway flexible, yet, consistent across cities. However, cities with more experience and already established urban innovation partnerships will only need to implement the most necessary steps/tools/templates.



Optional step/tool



Recommended step/tool



Fundamental step/tool

How to use this guidance

The guidance is divided into two parts. The first part addresses the **co-creation pathway** and the understanding of **co-benefits**, as well as **stakeholders'** involvement in the co-creation processes. This part addresses the definitions of both the concepts of co-creation and nature-based solutions, the main principles of co-creation and the different principles of implementation, as well as possible challenges.

The second part focuses on the **co-creation pathway** steps for FR/FE cities to implement. The diversity of activities and **Toolkit** presented in this guidance are to support the Urban Innovation Partnership (UIP) to better implement the nature-based solutions (NBS) in CLEVER Action Labs (CALs).

Visual Structure

A series of boxes are presented alongside the text in different colours. Please follow the colour code to get a better orientation throughout the guidance. The guidance is intended to be flexible and easy to navigate, so the content is visually organized as follows.

<p>Tips</p> <p>A series of practical tips and advices.</p>	<p>Checklist</p> <ul style="list-style-type: none"> √ item 1 √ item 2 √ item 3
<p>Definitions</p> <p>Definitions of the main topics and concepts introduced in this guidance.</p>	<p>Further Readings</p> <p>The main bibliographic references for each chapter.</p>
<p>Take away</p> <p>Each chapter contains a box with the lesson learned organized in bullet points</p> <ul style="list-style-type: none"> • Highlight 1 • Highlight 2 	<p>Best practice</p> <p>A series of case studies are referred to throughout the text in order to support the corresponding content presented in the chapters.</p>

CLEVER Cities co-creation framework

Why a guidance on the co-creation of nature-based solutions is important

One of the main aims of nature-based solutions gaining ground in academia even if literature remains clearly/fairly practical, is the European Commission's initiative towards innovation policy agenda (European Commission, 2015). The NBS approach offers sustainable solutions to cope with the challenge of climate change in urban areas. NBS can include several strategies, such as the conversion of abandoned land into urban farms and community gardens, or the regeneration of post-industrial sites through the bioremediation of toxic soils and subsequent transformation into green spaces (Panno, Carrus, Laforteza, Mariani, & Sanesi, 2017).

These strategies open the door to equitable economic opportunity, profiting from a growing awareness of the value of nature, and also represent a great opportunity to enhance sustainable urbanism and nurture urban regeneration initiatives and improve the quality of life in urban areas. Lately, the priority of implementing nature-based solutions has been at the top of agenda for cities attempting to be more resilient, invest into green infrastructure and integrate nature-based solutions to improve microclimate, limit urban heat island phenomenon and improve air quality (City of Athens, 2017; UN-HABITAT, 2018).

Nonetheless, the nature-based solutions objectives and purposes go far beyond the adaptation and mitigation of climate change effects and ecosystems services; in fact, their replicability, multi-functionality, and resiliency improvement have been the key opportunity areas for collateral co-benefits in terms of human health, well-being, liveability, societal and economic benefits overall (Klimatek Project, 2017).

This guidance highlights the shift from urban green infrastructure and eco-system services and adaptation towards the use of nature-based solutions in cities to address a variety of social, economic and environmental challenges. Due to the complexity of topics encompassed by NBS, the involvement of local actors is crucial. That is why an important aspect of this guidance is to help identify who the main stakeholders are and how to best engage them throughout the whole co-creation process from Urban Innovation Partnership (UIPs) to CLEVER Action Labs (CALs), see [Figure 2](#).

Co-creation is a collaborative approach to engagement which allows stakeholders to collectively design and build more inclusive and sustainable mechanisms for change. In order to do this, it is important to identify who your stakeholders are and how to effectively engage them in the co-creation process to build inclusive and sustainable solutions. Existing guidance on stakeholder mapping and engagement has primarily defined key professional decision-makers such as policy-makers, local organisations and practitioners as stakeholders (see (Durham, Baker, Smith, Moore, & Morgan, 2014)), and as a result, have set out guidance that targets those particular groups. This guidance will also look at how to engage communities and the local population in nature-based solutions, as they are the ones who will predominantly be engaging with your NBS, and thus, are key in sustaining your co-creation processes.

Co-creation can hence be stimulated through the creation of a shared platform for engagement: helping to create a healthier, more inclusive, and sustainable approach to urban places; or by simply benchmarking against similar nature-based solutions to help mitigate climate change and adaptation strategies. The aim

is to bring on-board all stakeholders (Public – Private – Residents) by setting up public engagement plans (Carr, 2015).

Therefore, guidance on co-creation is fundamental for a better understanding on how the processes of co-creation of NBS can be integrative, responsive and socially inclusive to communities. In this context, the scientific framework of urban ecosystem services and NBS serves as an interface between policy and science to inform the urban planning and governance policies for cities (Frantzeskaki & Kabisch, 2015)

What distinguishes CLEVER Cities from other projects?

CLEVER Cities Project has a main focus of implementing NBS in Cities. In particular, it is distinguished by:

- The focus on a societal approach towards inclusive NBS implementation, beyond merely technical and economic feasibility approaches.
- Promote a co-creation approach for NBS implementation, which aims to be strongly integrated to the planning and policy practices of cities.
- Establishing a strong connection to urban resilience strategies; the focus on cities and innovation of procedures.

Added Value!

The CLEVER Cities Framework will be the first European H2020 Project to address the nature-based solutions at the level of city through Front-Runners cities implementation.

CLEVER Cities organizational framework of Urban Innovation Partnership (UIP) and CLEVER Action Labs (CALs)

Figure 2 illustrates how the CLEVER Cities local clusters and UIPs are established in FR cities, based on the organizational framework of Work Packages (WPs) as well as the CAL phases of implementation. This is based on various co-creation processes, including stakeholder mapping, engagement, monitoring, and platforms of co-design and local ecosystem.

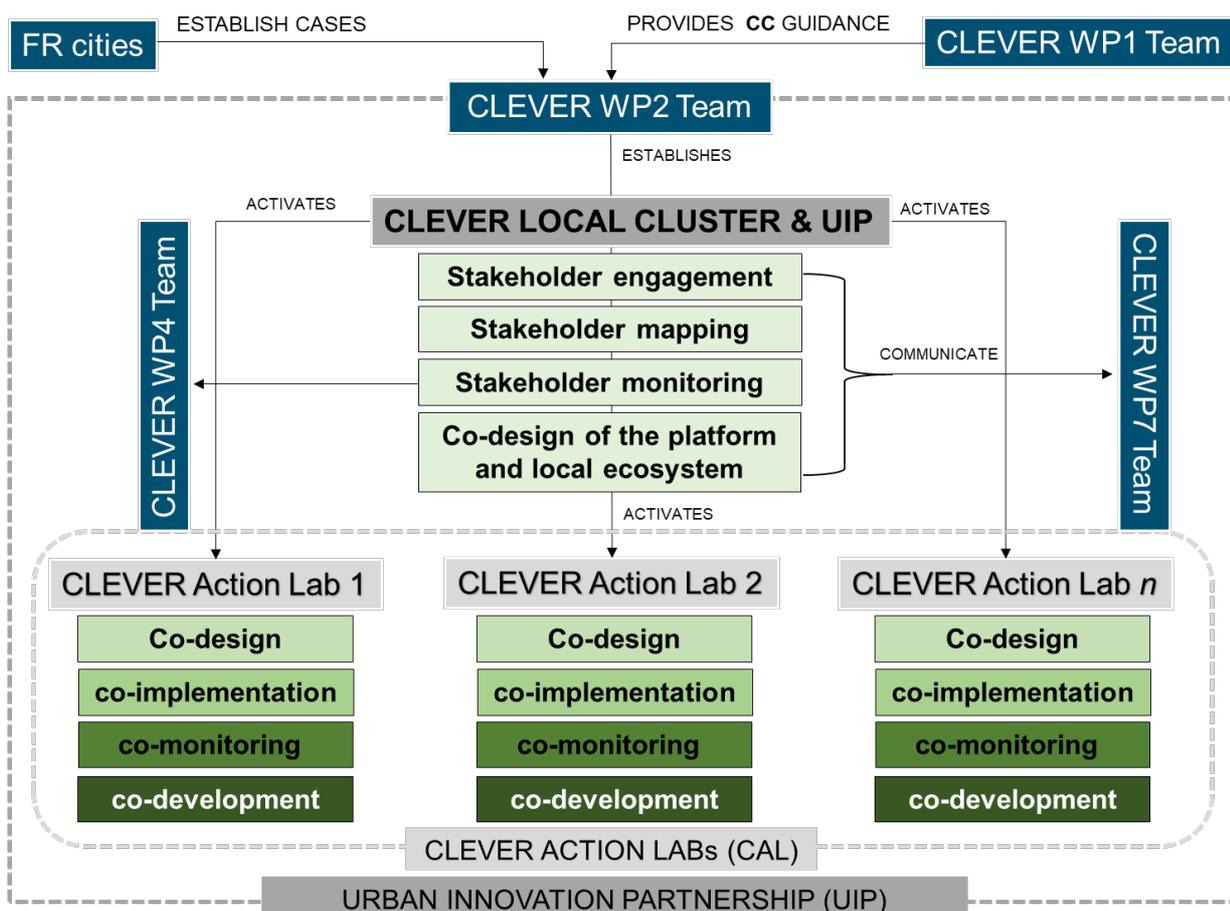


Figure 2: The organizational Framework of CLEVER Cities at the city local cluster: The Urban Innovation Partnership (UIP) and the Initiation of Clever Action Labs (CALs)

Tips:

The prescribed Co-Creation Pathway in this guidance is a CLEVER Cities tailored-based process (see Part II). The ideation remains the same beyond the FR Cities implementation processes; however, the value of co-creation in regeneration projects expands to other themes of social, economic and environmental co-benefits, see section [2.2](#).

Before starting the co-creation activities, it is crucial to:

- ✓ Develop some steps towards establishing the UIP and identify the project at the local city context.
- ✓ Identify, analyse, map and prioritise stakeholders to engage in your UIPs, CALs and other engagement activities
- ✓ Define the expected environmental primary benefits and co-benefits of envisioned solutions.

CLEVER Cities co-creation pathway and stages of implementation

Co-creation in the CLEVER Cities framework encompasses **co-design, co-implementation, co-monitoring** and **co-development**, see [Figure 3¹](#). The main notion of establishing a **Co-creation** process evolves on two horizontal axes (**stakeholders and co-benefits**). Stakeholders are expected to formulate inputs to the establishment of UIP and help define the later potential co-benefits. The UIP hence, works as a mixing pot for all potential stakeholders in the local cluster for FR Cities and/or represents an overall support for the co-creation processes to be held in FR Cities CALs. Individually, CALs go through a process of: defining co-design, addressing the co-implementation, verifying the co-monitoring, and sustaining the co-development.

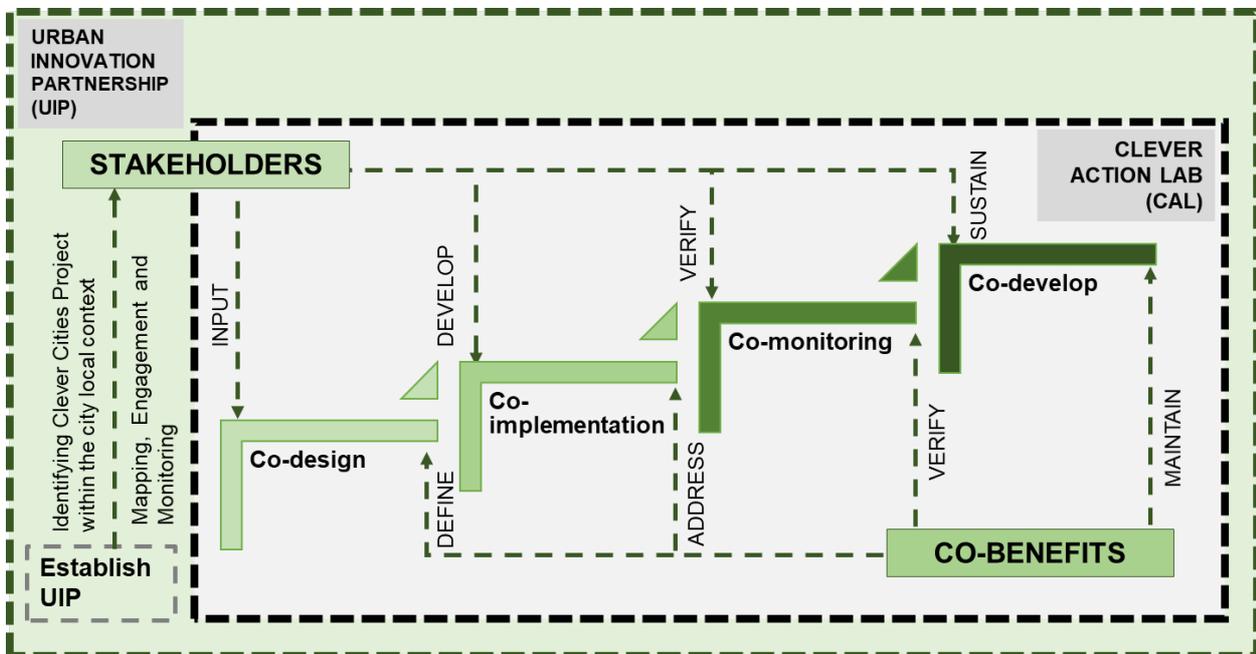


Figure 3: Diagram with the overall the UIP establishment and co-creation stages

The first part of the guidance mainly contains three chapters:

1. Co-creation pathway processes of implementation of nature-based solutions
2. Co-benefits of nature-based solutions
3. Stakeholder mapping and engagement

¹ On one hand, throughout the co-creation process, stakeholders will continue to develop, verify and sustain the following phases of co-implementation, co-monitoring and co-development. On the other hand, the co-benefits are defined based on co-design, in order to address the needs during the co-implementation and get verified by the co-monitoring, and finally maintained during the co-development.

Co-creation pathway in CLEVER Cities stages of implementation definitions, by the Grant Agreement:

- Co-design involves the collaborative design of urban regeneration interventions – CLEVER Stimuli. Novel smart technologies will be applied in this phase with the aim of improving the overall involvement of citizens in the process.
- Co-implementation is working with PEOPLE and partners to put the solution into action; the tangible interventions serve as a ‘test’ environment to make NBS marketable and sustainable.
- Co-monitoring is essential to CLEVER Cities Project Monitor to evaluate the NBS implemented and monitor the durability and quality of the interventions. The UIP, CALs and further residents will contribute to assess the impact of the interventions and success or failure of processes. Local smart urban platforms will be used to collect data to evaluate the implementation progress from a city-wide NBS development perspective.
- Co-development sets the scene to grow, test and develop the proposed solution by looking at details, and the local context to create a viable intervention; co-development requires pooling resources, skills, structures and relationships in order for the solution to thrive.

1. Co-creation for the successful implementation of nature-based solutions

Introduction

The co-creation of nature-based solutions is a fundamental approach to address the impacts of global environmental changes and create new opportunities for all people. Yet, the knowledge frameworks to influence the processes and outcomes of climate change mitigation and adaptation are still limited (Parsons, Fisher, & Nalau, 2016). Hence, this guidance aims to better understand the co-creation processes that shape the implementation of nature-based solutions in the best and most effective way. The main reference point for this guide is the CLEVER Cities project framework. Toolkits for the co-design and co-implementation of nature-based solutions will be developed for cities to use as reference in their co-creation processes.

Aims and Objectives of this guidance

The ambitious aim of CLEVER Cities to successfully support cities to successfully implement nature-based solutions through a co-creation approach. This requires a holistic approach ranging from the initial Stakeholder Engagement, through the Co-design of the challenges and carrying out of solutions, to further Co-development and replication of successful stories.

In this guidance, the taxonomies of nature-based solutions – definition(s), types, impacts and alternatives – will be explained later in this chapter. Hence, the Co-creation steps presented in this guidance are structured according to the processes of Stakeholder Engagement, Co-design, Co-implementation, Co-monitoring and Co-development. This guidance presents steps that are open enough to fit different urban contexts, as there is no one-size-fits-all solution.

Overview / Approach

Addressing nature-based solutions from the perspective of the European Commission requires a broad overview and a complex interplay between definitions, challenges and feasible solutions. In addition, implementation and funding of NBS are at the forefront of issues being tackled by many cities; including how to achieve and facilitate the implementation of NBS into public policies, and/or for tackling other barriers to implementation at the urban micro-scale. Nature-based solutions co-creation processes are hence intertwined with stakeholders' engagement throughout the implementation of different phases. These co-creation processes will also result in co-benefits in adjacent communities. Local residents will be able to verify the impacts during co-implementation, help maximize co-monitoring, and maintain the co-development on the long run.

Make sure your Co-creation Process is:

- ✓ An **innovative and active** collaboration between partners.
- ✓ Aims to **achieve co-benefits** on both local and city-wide scales.
- ✓ Is processed through **collective and shared governance** approach.

Co-creation generates co-benefits for local communities

Many nature-based solutions result in multiple co-benefits for human health and well-being, the economy, society and the environment, and thus they can represent more efficient and cost-effective solutions than more traditional approaches, as seen in the designed wind-rose tool of implementation, see [Figure 4](#). Hence, assessing the co-benefits is central to evaluating the impact of nature-based solutions in CLEVER Cities Action Labs (CALs).

The tangible realisation of co-benefits can help strengthen the whole participatory process and address community needs. This can take effect throughout the co-creation and co-designing of nature-based solutions, from inception to evaluation. The understanding of co-benefits must cross the entire co-creation process at both the urban district level and local level.

Alignment between UIPs and CALs:

Before starting the co-creation process, we must make sure to create an alignment between stakeholders on the co-benefits at the UIP level. UIPs could be individually formed for each CAL or collectively formed for a major urban regeneration project where a variety of nature-based solutions are taking place across multiple CALs.

1.1. What is co-creation?

Definition of co-creation:

Co-creation arose from the business world as ‘the practice of collaborative product or service development: where developers and stakeholders are working together’, see (Pater, 2009). However, the evolution of co-creation in urban planning policies from a user-centred approach to a co-creative designing changed in the practice as well, since earlier 2007 emerging new domains of collective creativity, see (Sanders & Stappers, 2008).

What co-creation is NOT:

- A ‘utilitarian’ relationship (use of the positive image of the partner without a real project).
- A client/supplier or service provider relationship.
- A short-term relationship or operation.
- A way of sharing social (NGO) and economic responsibilities.
- Sponsorship or philanthropy.
- A mere co-branding or labelling operation.
- A joint communication or public relations operation.

Co-creation gained ground in the academic literature as a ‘common framework’ to integrate the co-production of knowledge with the co-design of the research based on implementation phase outcomes, definitions, and joint framing of a social problem (Mauser et al., 2013). In addition to that framework, stakeholder involvement and academic institutional involvement were regarded through the lens of sectoral integration, with the ambition of transforming decision making processes into a reflexive learning processes that brings together different actors and knowledge practitioners (Galafassi et al., 2018).

In other words, successful solutions to environmental problems in a co-creation process require the combined efforts of different scientific disciplines and active dialogue between stakeholders from policy and society actors (Frantzeskaki & Kabisch, 2015).

From a business approach, these values of co-creating better and more innovative solutions have a wider impact on problem-solving; by taking a developmental approach towards co-identifying a problem/need and co-solving a solution for it (Aarikka-stenroos, 2016).

Further Reading

Co-creation must permeate all phases of decision-making in public procedures, according to social open innovation principles and the sustainable development goals (SDGs) towards the 2030 Agenda.

People collaborate to define problems, find and jointly implement solutions; co-creation focuses on peoples' experience and interactive relationships towards a more active involvement to create accepted and richer solutions.

For more see (Puerari et al., 2018)

1.2. Co-creation principles

According to Jansen and Pieters (2017, p. 4) complete co-creation processes will be perceived as inviting and inspiring for cities to tap into to address their challenges, if the following principles are achieved:

- **Togetherness:** there is equal collaboration between all internal and/or external parties.
- **End-users:** they must play a central role to the overall process.
- **Ongoing:** The process is ongoing and participative in every phase.
- **Productive:** it leads to implementation of the co-created solution.
- **Transparent:** relevant information is accessible to all.
- **Supported:** supported by all stakeholders.
- **Value-driven:** results in value creation for end-users and involved parties.

1.2.1. Co-Creation brings together different knowledge and capabilities

Co-creation is a new form of interaction which involves innovative and active collaboration between two or more partners: NGOs, foundations, public institutions, private companies, academics, representatives of civil society and/or local development organizations, and citizens themselves. Each partner brings a different expertise: some know more about the area, others about the people and their daily experiences, and others about the local challenges.

Through the process partners explore the benefits of cooperating and highlighting each other's strengths, making the whole process more efficient and leading to better quality outcomes. The cooperative dialogue is not designed to force compromises, but rather to facilitate learning and build on complementary strengths and assets.

1.2.2. Engagement of citizens and stakeholders in co-creation

A collaborative approach sits at the heart of CLEVER Cities – embedded through co-creation, co-design and co-implementation of activities and initiatives. Truly collaborative engagement will lead to greater buy-in from stakeholders and to the design of an NBS solution better suited to its context, both physical and social. As a result, greater co-benefits are likely to be achieved.

However, it should be remembered that *“engagement never happens in a neutral context and whenever citizens are invited to participate in any process, there will always be consequences for the distribution of control and power”* (Davies, Simon, Patrick, & Norman, 2012, p. 9).

Principles for stakeholder engagement

You may find it useful to summarise your approach in a set of simple principles which are easily understood and remembered.

Your role as facilitators of NBS change will be to manage and mitigate the implications of this distribution of power and control with your stakeholders and through mechanisms of co-creation work in partnership to deliver that change.

Many cities, and organisations find it useful to set out their own principles for engagement – a form of commitment to a genuinely collaborative process which everyone involved signs up to. These principles

set out the values and ways of working to which stakeholders will adhere during the process. The following example engagement principles check list are drawn from the experiences of Cities such as Berlin (Susanne Walz et al., 2012), Vienna (Arbter, 2012) and Edmonton in Canada (City of Edmonton, Aaron Aubin Consulting Inc., & O2 Planning + Design Inc, 2017)

Such a collaborative approach and the methods of co-creation, co-design and co-implementation may be new or even challenging to many stakeholders. It is therefore important to allow time to bring everyone ‘on the journey’ and support them to learn about the value of working in this way.

The **Step 02** outlined in this guidance Part II will help you understand who your stakeholders are and think about the best way to engage them in a co-produced process.

Example engagement principles:

- ✓ Recognises and values the experience and perspective of all stakeholders
- ✓ Open approach built on active listening
- ✓ Timely and transparent
- ✓ Inclusive and supportive, enabling equal participation of all
- ✓ Responsive and committed to acting on what is heard and learned
- ✓ Sharing and connecting – between people, groups, and interests
- ✓ Creative but clear about activities and plans

1.2.3. Co-Creation is expressed through collective governance

A recent shift towards empowering the community rather than just consulting or documenting it is reflected in an increasingly popular method called “participatory appraisal,” where local knowledge is not “extracted” by outsiders, but instead shared by its community, which is involved in problem-solving processes from the start (Rock, McGuire, & Rogers, 2018). However, that requires multi-stakeholder activity that in co-creation processes tend to be more conflictive or co-operative (ASHOKA, 2012).

As a successful example of shared governance on Co-creating NBS solutions, Athens City Council conducted a Co-creation workshop with local stakeholders, academics, experts in Nature-based solutions and a variety of non-profit organizations in order to co-design two pilot projects (a school yard and a community public space and garden). The main challenge addressed was to include all community and residents on board of the implementation to guarantee better citizens’ participation.

Best Practice of Co-Creation and Resilience:

The City of Athens (2017) conducted a co-creation workshop in September 2018 to address the urban heat island problem in the city as well as to verify its Resilience Plan in order to **Integrate natural systems into the urban fabric** as part of the New Resilience strategy proposed actions and goals. The Workshop included experts, academics from different universities, stakeholders from C40, CLEAN solutions and other Environmental NPOs.

https://www.c40.org/other/athens_city_solutions_2018

The co-creation Pathway in CLEVER Cities is a form of Open Innovation in which ideas are shared, closely connected to user-generated content and actively communicated to allow creativity and shared

responsibility. Moreover, co-creation in practice is more about motivating people, inspiring participation, sharing results, continuing development and delivering results at many levels.

1.2.4. Co-creation brings co-benefits and future spin-offs in shared results

Pater (2009) took a leap forward to identify the major ways in which co-creation processes achieve added value, such as co-benefits. Basically, co-creation results in a cultural paradigm change and future spin-offs:

- The direct results of a full co-creation project are the economic value generated by the return on investment as well as keeping participants engaged in the loop of progress and developments.
- The future spin-offs are the side-effects that are somehow unexpected, often hard to foresee, but result in added value to the long-term impact of co-created projects.

Best practice of co-creation:

The company Danone identified key stages for co-creation to develop an innovative win-win strategy for their stakeholders together with a communication strategy. They focused on co-building partnerships, co-designing, co-managing projects, and co-developing guidelines towards self-sufficiency.

See “Co-Creation: Opening societal project governance to maximize the creation and sharing of economic and social value”

https://www.ashoka.org/en/file/4036/download?token=8ZWa0_3Y

1.3. Co-creation applied to nature-based solutions: what does it mean?

1.3.1. Definitions and objectives of nature-based solutions

The original definition of “*Nature-based Solutions*” derives from the International Union for Conservation of Nature (IUCN) World Conservation Congress as: “*actions to protect, sustainably manage and restore natural or modified ecosystems, which address societal challenges (e.g., climate change, food and water security or natural disasters) effectively and adaptively, while simultaneously providing human well-being and biodiversity benefits*”, see (IUCN, 2012).

Definitions then slightly vary in scholars’ articles based on the main implications. So far, the most complete guidance on NBS was developed by The European Commission (2015, p. 4) to be adopted in the EU ‘*Research and Innovation policy agenda for NBS & Re-Naturing Cities*’ relying on four principal goals to address nature-based solutions as follows:

What are nature-based solutions?

Nature-based solutions are actions inspired by, supported by or copied from nature that aim to help societies address a variety of environmental, social and economic challenges in sustainable ways.

See European Commission (2015)

- **Enhancing sustainable urbanisation** through nature-based solutions can stimulate economic growth as well as improving the environment, making cities more attractive, and enhancing human well-being.
- **Restoring degraded ecosystems** using nature-based solutions can improve the resilience of ecosystems, enabling them to deliver vital ecosystem services and also to meet other societal challenges.
- **Developing climate change adaptation and mitigation** using nature-based solutions can provide more resilient responses and enhance the storage of carbon.
- **Improving risk management and resilience** using nature-based solutions can lead to greater benefits than conventional methods and offer synergies in reducing multiple risks.

Based on these four goals, seven nature-based solutions actions for ‘Research & Innovation’ actions are recommended to be taken forward by the European Commission and Member States:

- Urban regeneration through nature-based solutions
- Nature-based solutions for improving well-being in urban areas
- Establishing nature-based solutions for coastal resilience
- Multi-functional nature-based watershed management and ecosystem restoration
- Nature-based solutions for increasing the sustainability of the use of matter and energy
- Nature-based solutions for enhancing the insurance value of ecosystems
- Increasing carbon sequestration through nature-based solutions

1.3.2. Taxonomies and challenges addressed by nature-based solutions

Different types of nature-based solutions categorization, scales of interventions and taxonomies exist. The most adequate implementation of the nature-based 'tailored' solutions requires identification of the specific place-based challenges faced in the area of intervention. NBS classification could be elaborated by challenge type specifics (such as urban heat island, flash floods risks, etc.) or by scale of application (buildings, public space, infrastructure, etc.) and by interventions type.

Nature-based solutions are mainly a response form to mitigation and adaptation climate change risks. Both approaches seek to increase the resilience of ecosystems and thereby to stabilize the provisioning of ecosystem services. An important requirement for this is the stabilisation and strengthening of the functional relationships within the ecosystem and between species to increase their resilience (Naumann, Kaphengst, McFarland, & Stadler, 2014).

It is possible with nature-based approaches to combine climate change mitigation, adaptation, disaster risk reduction, biodiversity

conservation, and sustainable resource management. Nature-based approaches are often called "no-regret" options, meaning that the measures are useful even if the effects of climate change do not materialize as predicted. Such approaches are often cost-efficient and allow for flexibility in dealing with a constantly changing climate and its associated risks (e.g., in the case of coastal protection or in the fight against urban heat island effects).

Mainly depending on the types and scale of physical interventions, nature-based solutions could be classified as follows, see (Klimatek Project, 2017):

- Building-scale interventions
- Interventions in the public space
- Interventions in transport linear infrastructures
- Interventions in water bodies and drainage systems
- Interventions on natural areas and management of rural land.
- Coastal interventions

Other taxonomies exist based on the types of NBS intervention corresponding to specific challenges or hazards, rather than the scale of intervention, see (Ecoshape, n.d.; UrbanGreenUP, n.d.)

- Non-technical interventions
- Green infrastructure interventions
- Re-naturing urbanisation
- Water interventions

In nature-based climate change mitigation, ecosystem services are used to reduce greenhouse gas emissions and to conserve and expand carbon sinks.

In nature-based climate adaptation, the goal is to preserve ecosystem services that are necessary for human life in the face of climate change and to reduce the impact of anticipated negative effects of climate change (eg. more intense rainfall, more frequent floods as well as heat waves and droughts), see [the challenge of climate change – partnering with nature.](#)

1.3.3. Policies and Framework of NBS implementation in the EU context

While nature-based solutions are not new to the world of climate change adaptation and mitigation (previously under the umbrella of Ecosystem-based Adaptation (EBA), Urban Green Infrastructure (UGI) and Ecosystems Services (ESS), see (Kabisch et al., 2016; Kabisch, Korn, Stadler, & Bonn, 2017)). In most cases, these approaches are complementary, have considerable overlap, and are also used in the non-urban context. All of these terms focus on developing systemic approaches utilizing concrete implementation actions as solutions to address impending climate pressures and risks, based on the specific context (Bourguignon, 2017).

Objectively, the idea, which the IUCN defined in (2012) from a slightly different perspective, can be seen as an umbrella concept covering several approaches promoting the protection, sustainable management and restoration of ecosystems as a way to address societal challenges, while providing human wellbeing and biodiversity co-benefits. Related approaches and problem-solving techniques include 'ecosystem services', 'ecosystem approach', 'ecosystem-based adaptation and mitigation', 'blue-green infrastructure' and 'ecological engineering' (Cohen-Shacham, Walters, Janzen, & Maginnis, 2016).

Further reading:

The IUCN Programme 2013–2016. Gland, CH: IUCN.

http://cmsdata.iucn.org/downloads/iucn_programme_2013_2016.pdf

The European Commission framework developed a research and Innovation agenda on nature-based solutions to better understand the possible opportunities and challenges for nature-based solutions in EU member states (Faivre, Fritz, Freitas, de Boissezon, & Vandewoestijne, 2017). In European Union (EU) policy, nature-based solutions are primarily addressed through the Horizon 2020 framework programme for research and innovation, which allocated approximately €185 million to the topic between 2014 and 2020. Other EU funds, estimated at €915 million per year, are also allocated to support green infrastructure projects. Other relevant policy initiatives include the 7th environment action programme, the biodiversity strategy, and the communication on green infrastructure.

In the context of the on-going political debate on jobs and growth (main drivers of the current EU policy agenda), the European Commission underlines that nature-based solutions can transform environmental and societal challenges into innovation opportunities, by turning natural capital into a source for green growth and sustainable development. For the European Commission, NBS are sustainable measures that aim to simultaneously meet environmental, societal and economic objectives. Hence, the co-creation Pathway of CLEVER Cities should rely on these objectives for maintaining and enhancing natural capital.

Best practices of Nature-based Solutions:

Nature4Cities is a H2020 EU-funded project, creating a comprehensive reference Platform for Nature Based Solutions (NBS), offering technical solutions, methods and tools to empower urban planning decision making. This will help addressing the contemporary environmental, social and economic challenges that face European Cities.

See <https://www.nature4cities.eu/>

1.3.4. NBS and Urban Regeneration for addressing community needs

From a more holistic point of view, 'Nature-based Solutions are approaches, that use environmental processes and natural systems to help address a human or community need'. Nature-based solutions can look very different from community to community depending on the type, location, and scope of the hazard addressed, see (Leung, Woiwode, & Smith, 2018). Examples range from preservation and restoration of existing natural habitats, to engineering that combines services provided by nature with traditional grey infrastructure to be transformed in blue and green infrastructures.

Henceforward, the implementation of nature-based solutions in CLEVER Cities plays an important role in connecting planned outcomes for urban regeneration processes with responses to specific societal challenges at the local level. De Lotto (2017) highlights the multi-scalar and interdisciplinary operational actions and tactics for incorporating NBS in planning policies and the management of urban regeneration projects: whether minimal interventions in ecosystems, intensively managed ecosystems and landscapes, and/or very intrusive ways to co-create new ecosystems, such as artificial ecosystems like green and blue infrastructures (Eggermont et al., 2015).

In fact, the interventions of NBS such as “*Re-Naturing Cities*” strategies cross beyond the boundaries of environmental improvements towards a multifunctional benefits approach that differs based on city contexts.

Tip:

For other different approaches on NBS outside the EU context, see *Engineering with nature – American Initiative*

<https://ewn.el.erdc.dren.mil/about.html#>

Urban regeneration², in connection with the CLEVER Cities framework, broadly encompasses the idea of improving, reorganising and upgrading an undesirable urban context (as opposed to the planning of new urbanisation). It can, for example, refer to the redevelopment of overcrowded areas of the city, economic growth in an area, or property development, see (Pastak & Kährlik, 2016; Vickery, 2007; Williams, Atkinson, & Tallon, 2017). Areas targeted for regeneration can be: spaces that have been abandoned (e.g. disused factory sites and buildings) or neglected (e.g. rivers that have been polluted); places facing particular environmental challenges, such as lacking quality green spaces or high vulnerability to climate change impacts; or areas facing social and economic issues, such as reduced human health and wellbeing, inequality and crime.

The Commission for Architecture and the Built Environment (CABE), which maintains the policy discourse of design-led regeneration, released guidance that maintaining environmental character and continuity should be core principles of urban regeneration policies (CABE, 2004). Henceforth, utilising NBS as a tool to achieve urban development goals while also benefiting society and the environment, can support a more inclusive urban regeneration towards a greater sense of community, combating social exclusion and reducing gentrification and inequalities within and between cities and regions (UIA, 2018).

² The CLEVER Cities project has chosen to focus on the term urban regeneration as it is the most widely recognised and used by both policy makers and in academia (Tallon, 2013).

1.4. Co-creation in CLEVER Cities approach

In the **CLEVER Cities** approach, co-creation is developed as a whole process of participation, collaboration and interaction. The Pathway is designed in steps and feedback loops that considers stakeholders' abilities to create and provide added value. The complete co-design process works in conjunction with innovation towards a customization of nature-based solutions for the specific urban contexts of FR cities and FE cities.

The process envisages **CLEVER Action Labs** as **Urban Living Labs (ULL)** that ideally are strategic, civic and organic, and incorporate a wide spectrum of experimental platforms for governance, interventions and change. **CALs** are test-beds where cities implement at the innovative co-creation processes and nature-based solutions, bringing together different socio-spatial relations. They thus act as a bridge or interface between policies and scientific work to inform urban planning measures, governance and techniques (Bulkeley et al., 2018).

Best practice of ULLs

Urban Living Labs offer opportunities to foster sustainability in cities as sites to co-design, test and learn from innovation.

A comparative study for the ULLs was conducted in 4 European cities to analyse the success based on the leading actors of partnerships whether user-driven or enabler-driven, see (Menny, Voytenko Palgan, & McCormick, 2018). For examples on ULLs indicators and good practices see (Puerari et al., 2018; Schumacher, 2011).

Co-created solutions, such as in the case of CLEVER Cities, are envisioned as **'tailored' nature-based solutions** which enable cities to make decisions grounded in validated assumptions. This prevents the wasting of time and economic resources in the FR Cities test-beds (CALs) and allows FE Cities to learn from their experience. In sum, co-creation is a starting point of processes which usually have far reaching effects; however, some results cannot be measured in terms of profit but create enormous spill-over values in terms of co-benefits and future spin-offs, beyond those which correspond directly to the original project goals.

The approach to co-creation in CLEVER Cities **actively involves end-users and stakeholders** along the entire process and takes advantage of the different expertise that they provide. The co-designed Pathway is a procedure based on transparency, ongoing productive collaboration and supporting valuable solutions for co-implementation. The involvement of actors along the process can be summarized as:

- **Establishment of UIP** by sharing expertise (field, technical, sector-based, business, financial) and additional resources.
- **Co-design³, co-implementation and co-monitoring** the project: from design to assessment via cooperative management and the exploration of new forms of governance.
- **Co-development:** shared investment, replicability of successful experiences, procurement to the overall process and long-term planning.

³ Co-design is a well-established approach to creative practice, particularly within the public sector. It has its roots in the participatory design techniques developed in Scandinavia in the 1970s. Co-design is often used as an umbrella term for participatory, co-creation and open design processes (Chisholm, n.d.).

2. Understanding the co-benefits of NBS

Introduction

Many nature-based solutions result in multiple co-benefits for health, the economy, society and the environment, and thus they can represent more efficient and cost-effective solutions than more conventional approaches. However, nature-based solutions are considered highly advantageous because of their inherent capacity to provide important social, economic, and environmental benefits; for example clean water, healthy environments, and green spaces for recreation, in addition to their primary function for climate mitigation, adaptation and flood management (Leung et al., 2018).

Co-benefits and Nature-based Solutions

In urban landscapes, the co-benefits of NBS are being increasingly recognized as a result of provisioning and improved availability of urban green spaces, such as parks, green corridors, etc. Even though not exhaustive of NBS types, such collateral benefits include, improved quality of life, mental and physical health, and reinforced cultural identities, supporting a sense of belonging and place, etc., see (Keniger, Gaston, Irvine, & Fuller, 2013; Nesshöver et al., 2017).

Moreover, an overarching review of the literature highlights the importance of health benefits generated by nature-based solutions, in particular, see (Hartig, Mitchell, de Vries, & Frumkin, 2014; Shanahan, Fuller, Bush, Lin, & Gaston, 2015).

For instance, many communities are looking to change the way they invest in nature-based solutions. For example, green walls and storm water management are being adopted as more holistic approaches, including innovative and regenerative nature-based solutions that help protect a community's quality of life, save lives, produce environmental benefits, and reduce costs to taxpayers.

Taking this aspect of multi-functionality into account and considering the plethora of co-benefits produced, nature-based solutions are often seen to represent more efficient and cost-effective solutions to climate change threats than conventional approaches, such

Key points:

- ✓ **Co-benefits are mainly social, economic and environmental.**
- ✓ **Co-benefits are an outcome for a collaborative designed process and inclusive network of stakeholders.**

Further reading:

Major information on defining key concepts and associated indicators to measure impact of NBS on urban regeneration within CLEVER Cities are in the D1.1.4.

See (Davis et al., 2018)

Tips:

So far, there is not a unified definition of co-benefits, but many studies have defined respectively the impacts of co-benefits in urban regeneration processes. The definition and concepts may vary depending on targeted area or sector of policy/study. This diversity stemmed from a common perspective that not only policies are explicitly designed to pursue climate or developmental objectives can generate co-benefits.

For more see (Miyatsuka & Zusman, 2015).

as regular sewage or air conditioning systems, see (Connop et al., 2015, p. 100).

2.1. What are the co-benefits of nature-based solutions?

The term “co-benefits” appeared in the academic literature in the 1990s and generated wider interest around the time of the Third Assessment Report (AR3) of the Intergovernmental Panel on Climate Change (IPCC) that was published in 2001. The IPCC AR3 distinguished co-benefits as the intended positive side effects of a policy from ancillary benefits or unintended positive side effects, see (IPCC, 2007).

Nature-based actions offer simultaneously a wide range of sustainability benefits, including urban heat island mitigation, enhanced biodiversity, community pride and cohesion, and improvements in human health and wellbeing, see (Fan et al., 2017; Xing, Jones, & Donnison, 2017).

Further validation from case studies, see (Raymond et al., 2017; Walters, Janzen, & Maginnis, 2016) has shown three main results of implementing NBS in urban areas as a form of governmental ecosystem based adaptation or climate change mitigation policy:

- 1) improved feeling of wellbeing and reduction in mental health issues
- 2) integrated environmental performance and synergies with Biodiversity
- 3) improved feelings of local pride, and potential citizen’s involvement in governance and monitoring

In addition, adjusting co-benefits of general nature-based solutions for a more Place-based solution such as a neighbourhood scale is important as a key asset for a resilient community. However, both approaches should be coordinated and managed with residents and local community stakeholders for better co-design, co-implement and achievement of desired co-benefits.

2.2. Co-benefits impact indicators in CLEVER Cities framework

In CLEVER Cities, a validated approach drawn from case studies was developed to define key indicators for measuring NBS impact based on three dimensions of urban regeneration, see (Davis et al., 2018). The corresponding indicators used in this framework of assessment include “*People, Business and Place*” as the main dimensions of urban regeneration aims and activities. Four thematic topics have been identified amongst these indicators to better prioritise and design a pertinent impact measurement framework within implementation sites in the FR Cities (Hamburg, London and Milan), as follows:

1. Human Health and well-being

Definition of co-benefits

Co-benefits are the added benefits we get when we act to control climate change, above and beyond the direct benefits of a more stable climate. They are sometimes referred to as “multiple benefits” or “synergies”. They do not include the direct benefits of climate policy arising from a more stable climate, see (Smith, 2013)

At its core, a co-benefits approach is a win-win strategy aimed at capturing both development and climate benefits in a single policy or measure (Miyatsuka & Zusman, 2015).

2. Sustainable economic prosperity
3. Social cohesion and environmental justice
4. Citizen safety

The following chart see [Figure 4](#) mainly divides sub-indicators by theme of impact as explained earlier.

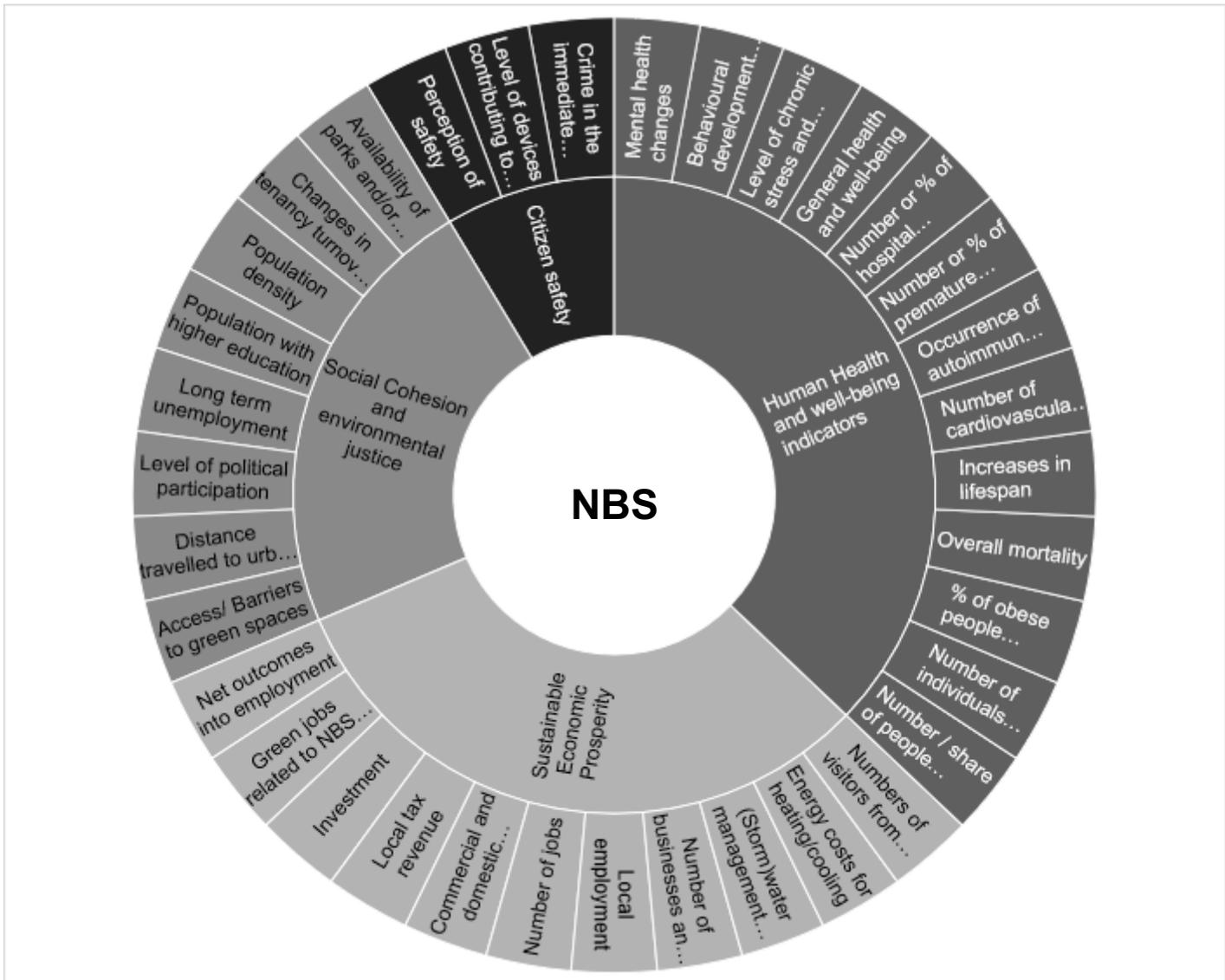


Figure 4: Wind-rose tool of verifying NBSs impact indicators at the centre of Health and well-being, sustainable economic prosperity, social cohesion and environmental justice, and citizen safety.

All indicators are based on CLEVER Cities D1.1.4, see (Davis et al., 2018) {re-elaborated by the authors, inspiration based on (Christopher M. et al., 2017)} Data in this chart⁴ is editable from the following external [link](#).

⁴ This chart is mainly explained in toolkit to be used by cities to prioritize their needed co-benefits, refer to [step01_tool 1.3a](#)

3. Stakeholder engagement at all levels of implementation

Stakeholder engagement is a fundamental part of any co-creation, including co-design, and co-implementation process. This chapter provides you with the guidance and tools to effectively identify and engage your stakeholders.

Stakeholders can be defined as people, groups or organisations that have a vested interest in initiatives and/or activities being undertaken and can be affected by the issues concerned (Aligica, 2006). There can be different types of stakeholders who operate at different levels and at different scales or issues (IDS, 2013) which, as shown in **Figure 5** (adapted from (UNICEF, 2016)), can range from the individual/community level to the macro/policy level who will engage differently with the process and will vary in their degree and level of engagement throughout the project. The BiodivERsA Handbook of Stakeholder Engagement, see (Durham et al., 2014), provides a useful complement to this chapter.

Key points:

- ✓ **‘Stakeholders’ means everyone who has a stake in any aspect of your activities** – you should think broadly about who will be affected or have an interest
- ✓ **Well-planned and inclusive engagement leads to better outcomes**
- ✓ **Start by identifying your stakeholders and then analyse their needs, interests and preferences**
- ✓ **You should then map and prioritise your stakeholders to inform the development of your engagement plan**
- ✓ **Engagement should be participatory, inclusive and tailored to each stakeholder group**
- ✓ **Make sure to regularly monitor and evaluate the effectiveness of your stakeholder engagement.**

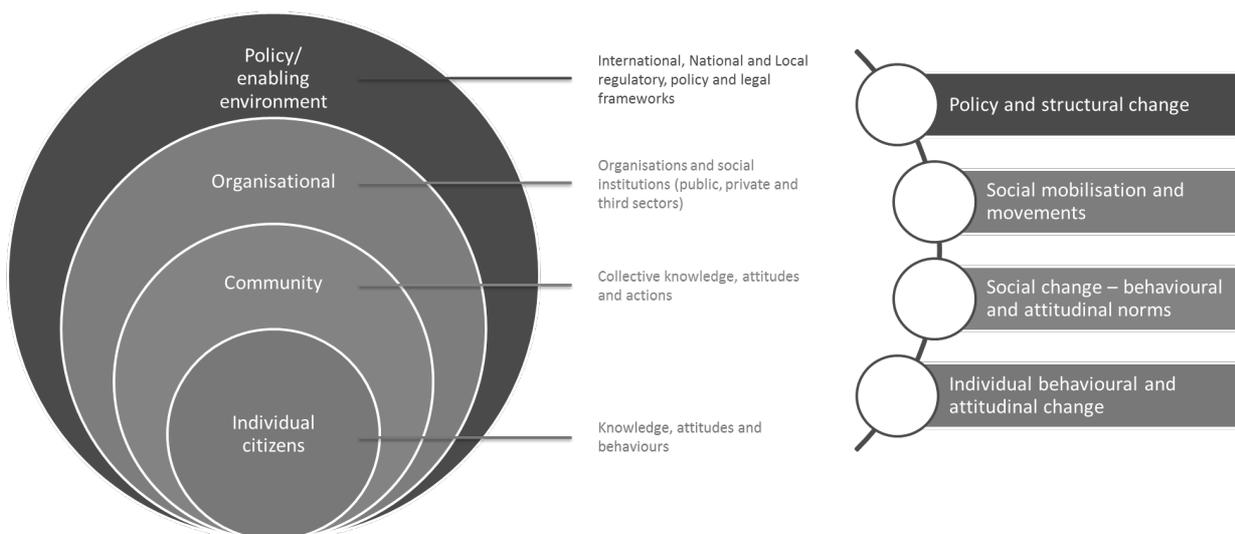


Figure 5: Ecological model of stakeholder engagement.

Stakeholder Mapping and Engagement often is referred to as identifying, attracting and involving people or groups to take part in initiatives and/or activities. The UNDP (2017, p. 21) guidance on stakeholder engagement, highlighted that stakeholder mapping seeks to answer the following questions:

- Who are the key stakeholders of the proposed project?
- What are the interests of these stakeholders related to the project?
- How will stakeholders' interests be affected (positively/negatively) by the project?
- Which stakeholders are the most vulnerable and subject to potential adverse impacts?
- Which stakeholders yield the most influence to affect project outcomes?
- Whose capacity needs to be supported to enable them to participate?

This provides the foundation for developing an engagement and co-creation plan as it allows you to create a system of prioritisation for different stakeholders in engagement and co-creation activities. There are various ways in which this can be done which will be discussed in more detail in section [3.3](#).

3.1. Why is it important to map and engage stakeholders in co-creation and NBS?

Stakeholder engagement matters for a number of reasons. Well planned engagement with those who will be affected by the 'solutions' developed and/ or those who have influence over if and how solutions can be co-implemented, will be crucial in helping you to reach the best possible outcome. An inclusive group of stakeholders will bring a breadth and depth of knowledge, skills and resources which are unlikely to be found through traditional 'expert' groups.

A truly participatory approach to stakeholder engagement will also encourage the development of new relationships which in turn can lead to more innovative ways of working, creative solutions and, potentially deeper systems-level change, e.g. changes in organisational culture, policies and procedures. Ultimately, the more 'bought-in' and invested all parties are in a given solution, the more likely it is to be successful when rolled out. Therefore, it is important to ensure that stakeholders are fully aware of what can be expected, and all activities are tailored and suit the needs of the stakeholders involved.

Building on the work of Arnstein (1969), the International Association for Public Participation developed a five-point spectrum of public participation (IAP2, 2014). These approaches to engagement can also be categorised as participatory and non-participatory. While non-participatory methods are very one-sided, where you either impart or extract knowledge, participatory methods are more two-sided, meaning you collaborate with others to generate change.

These approaches are as shown in [Table 1](#) (adapted from (Arnstein, 1969), (Durham et al., 2014) and (Robertson & Lepik, 2013)):

Table 1: Different Levels of and approaches to stakeholder engagement

Level of Engagement	Nature of Approach	Description
Inform	Non-participatory	A uni-directional flow of information from programme to stakeholder
Consult		A process by which stakeholders are asked for information or their opinions.
Involve	Participatory	Stakeholders are involved in discussions about the programme and can influence decisions, but are not directly involved in decision making
Collaborate		Stakeholders are fully involved, often included in decision making
Empower: full involvement, often lead on decision -making		Stakeholders are fully involved, often facilitated to lead on decision-making

Although non-participatory methods are often important steps in ensuring the legitimacy of decision-making, these approaches are often considered tokenistic because in some contexts stakeholders lack power to effect change as they are excluded from the final decision-making processes. The highest level of participatory engagement in the IAP2 spectrum (see (IAP2, 2014)) is 'empower', where stakeholders lead the work and potentially take it forward.

However, this has been subject to some challenge as either unfeasible or undesirable in many situations and although this spectrum is now widely used, many (including (Durham et al., 2014)) leave this final stage out.

The spectrum and a consideration of the different dimensions of participation should help you to design a stakeholder engagement strategy which is nuanced and reflective of local context.

Engagement dimensions

A review of public participation, see (Brodie et al., 2009), also identified several dimensions along which engagement can vary. You should consider which of these are relevant to your stakeholders and adapt your engagement methods accordingly.

On each dimension, a spectrum:

- ✓ **Unstructured - structured**
(e.g. the extent to which it takes place through existing channels or organisations)
- ✓ **Informal - formal**
(e.g. the extent to which it is interconnected with traditional, formal decision-making bodies and processes, or has its own governance mechanisms, vs. more informal approaches)
- ✓ **Passive - active**
- ✓ **Individual – collective**
- ✓ **One-off – ongoing**
- ✓ **Unpaid – paid**
- ✓ **Reactive – proactive**
- ✓ **Self-interested – altruistic**
- ✓ **Resisting change – driving change**
- ✓ **Online - offline**

In CLEVER Cities, stakeholder engagement activities will likely cover the full range of approaches.

- Non-participatory activities include:
 - Activities which are primarily designed to inform: Communications activities, online learning activities, materials, research outputs, webinars, conferences
 - Activities which are more consultative: Public workshops, webinars and conferences
- Participatory activities may include:
 - UIPs and the establishment of other advisory or decision-making boards

Some activities transcend different types of methods, for example a public engagement event which is designed to both inform people about activities but also to bring people in to a co-design process. When planning activities, it is important to distinguish the types of stakeholder activities you will undertake, and the level of participation required for these activities.

3.2. How to identify and map stakeholders

Durham et al. (2014) defined a three-staged approach to identifying stakeholders. In stage one, they suggest identifying all potential stakeholders and stakeholder groups. At stage two, they recommend assessing and prioritising the stakeholders, and, in stage three, they advise developing an understanding of your stakeholders. Most guidance on stakeholder mapping incorporates elements of these three activities. In this guidance, however, we recommend going a step further and have broken mapping down into four phases, based on the approach of (BSR, 2011).

1. Identifying
2. Analysing
3. Mapping
4. Prioritising

3.2.1. Identifying

When mapping stakeholders, it is important to scope, identify and list the relevant groups. In doing this, it is important to take into account several things to ensure that you are able to fully capture your potential stakeholders: what you have done in the past; who you involved; what worked well; and what has not. Cities are generally diverse areas housing different people with different backgrounds, needs and views. It is important to understand your local population and stakeholders at all levels from individuals to policy-makers and to make sure that your stakeholder list includes a diversity of expertise, geography, and characteristics that represents your stakeholders across the spectrum.

Not all stakeholders will be immediately obvious, and it is particularly important to be aware that some groups or people are often less engaged in such processes. There are various ways in which you can go about identifying stakeholders, such as the Six Key Questions model which can be found in [Tools 2.1](#).

3.2.2. Analysing

Once you have developed a comprehensive list of stakeholders, the next step is to analyse each stakeholder (or group of stakeholders) to understand who they are, their interests, needs, views and perspectives. During this process you may identify additional stakeholders who should be added to the list and analysed in turn.

BSR guidance (2011) highlighted that by understanding stakeholders' relationships with the issue(s), one can start to define how different stakeholders can be involved. In this guidance, we break this down in various ways (see [Tools 2.2](#)), but in the main, the questions you may want to ask when analysing your stakeholder list are:

- What contribution and/or perspective would the stakeholder bring?
- What level of expertise and experience do they have on the issue?
- What is their stake in the issue/initiative?
- Are there any conflicts of interest?
- Have you worked with them before and how were they to work with?
- How willing to engage are they?
- What would be involved in engaging them, e.g. what is their preferred method of being involved/engaged?
- How much influence does the stakeholder have, with whom and on what?
- To what extent is it important to involve them and why?

In answering these questions, as highlighted by the UNDP (2017), stakeholder analysis should be *“conducted in a gender-responsive, culturally sensitive, non-discriminatory and inclusive manner, identifying potentially affected vulnerable and marginalized groups and providing them opportunities to participate”*.

3.2.3. Mapping

With your analysis complete, the next step is to map your stakeholders. This is typically done visually, on a two-dimensional matrix (see [Tools 2.3](#) for more detail). The purpose of mapping is to help you identify the most appropriate form of engagement for each set of stakeholders. Different sets of guidance use different criteria for their axes - BSR (2011) uses Expertise vs. Willingness, and LCIP (2011) use Influence vs. Interest. It is important that you identify which criteria will help you best for your activities.

What categories you use will very much depend on what your priorities and ultimate goals are, e.g. to generate a stronger evidence base or to influence change. [Figure 6](#) shows an example of a stakeholder map produced by Groundwork and the Greater London Authority.

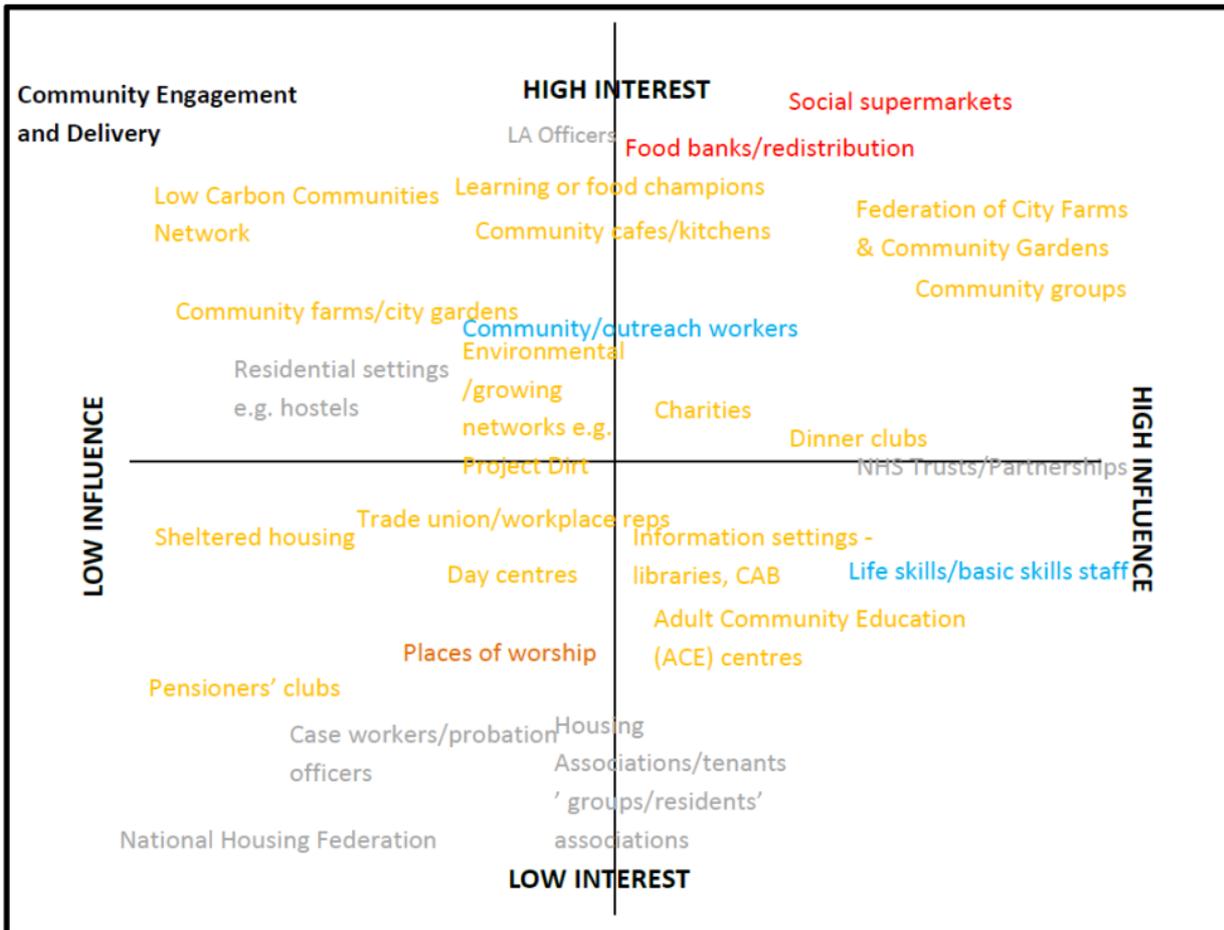


Figure 6: Example of a stakeholder map produced by Groundwork and the Greater London Authority (used with permission)

3.2.4. Prioritising

Once stakeholders have been mapped, you can start to prioritise who will be engaged and in what way. One approach is to look at your “theory of change⁵”. A theory of change allows you to map out your inputs and your outputs from the CALs in the context of NBS. This will help you identify what outcomes you will want to achieve and how to measure them.

Different stakeholders will need to be engaged at different stages, in different ways and for different purposes. Creating a system of prioritisation, (where you define who will be engaged in what and how), early on in the project can save on time and resources. One way to do this is to generate a table, for example as in

⁵ A theory of Change is description or model of how a desired goal or change is expected to happen as a result of one or more interventions or activities, within a specific context. It is sometimes also referred to as creating an “outcomes framework” or “logic model”. The process starts by identifying the long-term goals and outcomes, and then working backwards through the intermediate and short-term outcomes that must be in place to achieve it – creating a causal thread from action to outcome.

[Table 2](#) that defines your prioritisation criteria. A more detailed Stakeholder Engagement Planning template can be found in [Tools 2.4](#).

Table 2: Example table for defining stakeholder prioritisation criteria

Stakeholder (by sector)	Reason for engaging	How engaged they will be	Their roles and responsibilities	When they will be engaged
Stakeholder A	School operating within CAL locality	High	<ul style="list-style-type: none"> - Facilitating co-design and co-implementation of initiative with children - Supporting the evaluation 	Throughout
Stakeholder B	Local MP	Medium	<ul style="list-style-type: none"> - Provide public support for CC, the UIP and CALs - Attend key events relating to CC programme - Providing quotes for media & reports 	At key junctures of programme – will require several weeks advance notice of events/ publicity sign-off

When developing and applying your criteria, you may want to consider the following points (adapted from (BSR, 2011)):

- What is the level of expertise, interest and/or contribution that the stakeholder can give to this project?
- How are they likely to engage with the project and in what way?
- What type of resources do you need and/or are able to allocate to your engagement strategy and follow-up activities?
- Who is important to involve in the different components and stages in the project?

These considerations will help you maximise your resources and minimise the burden of these activities in terms of time and effort required from stakeholders. Although this guidance focuses on engaging stakeholders in co-creation activities in the form of UIPs and CALs, it is important to also identify and take into account the value and contribution stakeholders can make to the whole CLEVER Cities programme of work. In the following section we will cover the means by which you can start engaging stakeholders.

3.3. How to engage stakeholders

A key factor in successful stakeholder management is the identification of relevant community and city challenges (Aversano, Baccarne, & Schurman, 2017). By tailoring the content, scope and focus of any project or programme to the interests and priorities of the people and partners working with it, projects are thus defined through co-design and co-production and have an inclusive approach.

It is important to understand what your NBS is seeking to achieve, the methods involved and how different stakeholders can be involved in that process. While UIPs and CALs will mainly involve participatory methods, it is important to also consider the purpose of each individual engagement, as the following techniques:

- **Opening Out** techniques can be used for opening up a dialogue and gathering views from stakeholders about issues linked to the NBS and is usually applied to the development and initial co-implementation of the project.
 - Methods used can include brainstorming, listing ideas, using venn diagrams, and carousels.
 - Other creative participatory methods can include: community/ asset mapping; accompanied walks; participatory video and photo voice activities; and play/ artistic approaches for children.
- **Exploring** techniques will allow you to explore and critique your approach and findings from the NBS.
 - Methods can include mind-maps, problem tree analysis and SWOT analysis. Some of the Opening Up techniques can also be useful for these purposes.
- **Closing Down and Deciding** techniques can be used to start closing down options and deciding upon actions.
 - Methods include voting, ranking, prioritisation exercises and multi-criteria decision modelling.
 - Other participatory methods can include: citizen juries/ panels and the Delphi method

At each stage you will need to identify the methods that best suit your project and stakeholder group. When using [Tools 2.4](#), you will need to consider and incorporate these methods into your table. Furthermore, while it is important to adopt and include participatory approaches in the development of your NBS, this does not mean that such approaches should be used to the exclusion of traditional informational and consultative techniques.

Surveys and structured interviews, for example see [Tool 1.4](#), may remain a highly effective method of understanding the views of a large and representative sample of the local community. The results and implications of such research can then be built upon through more participatory methods.

In picking your methods of engagement, it is important to consider the diversity, needs and preferences of your group to ensure their meaningful participation. There are a growing number of digital tools (see, for example,

Useful tools and guides to techniques:

You can learn more about many of the techniques described by following the hyperlinks below and find full links in Bibliography.

Guides to Opening Out techniques:

[Brainstorming](#) – (Mind Tools, 2018a)

[Venn diagrams](#) – (DHHS, n.d.)

[Carousels](#) – (Stix, 2012)

[Community/ Asset mapping](#) – (Preston City Council, 2017)

[Participatory video](#) – (Insight Share, 2006)

[Photo voice](#) (Velea & Alexandru, 2017)

[Artistic approaches for children](#) (Kleine, Pearson, Poveda, & Holloway, 2016)

Guides to Exploring techniques:

[Mind-maps](#)- (Mind Tools, 2018b)

[Problem-tree analysis](#) -(ODI, 2009)

Guides to Closing Down and Deciding techniques:

[Multi-criteria decision modelling](#) - (DCLG, 2009)

[Citizen Juries/ Panels](#)- (NCCPE, n.d.)

[The Delphi Method](#)- (Grime & Wright, 2016)

(Parks, D'Angelo, & Gunashekar, 2018)) which allow you to seek stakeholder input and help to make decisions collaboratively, but are often tools which can lead to the exclusion of important stakeholder groups and hence should be used with caution. It is important to both identify who your groups are, and to devise engagement strategies which are tailored to their needs and preferences, helping to overcome barriers to participation.

The Inclusivity Index Checklist ([Tools 2.5](#)) can help you do make sure your engagement activities are inclusive and accessible. It is also a good idea to ask key representatives from your target groups for feedback and/or to pilot your methods.

3.4. Monitoring and evaluating stakeholder mapping and engagement

Monitoring and evaluation are very important in ensuring that your mechanisms for stakeholder mapping and engagement are affective and have the intended impact. You can use your theory of change to do this. Alternatively, Durham et al. (2014) state that the evaluation process needs to consider:

1. Are the goals of the engagement process being met?
2. How is the engagement process running? What has worked well and what needs improving?
3. What impact has the process had?

They state that the evaluation process can be broken down into the following stages:

- **Stage one: Set up** your evaluation framework and tools. It is recommended you do this from the outset to ensure that you are clear about your aims and what you want to achieve and are able to capture and monitor your activities effectively that will be able to show you are achieving your intended outcomes throughout your project. This includes developing tools you can use throughout, such as attendance forms, feedback forms or evaluation discussions.
- **Stage two: Monitor** process and progress as you go along. This will help you identify any issues and/or risks and mitigate against them, as well as, identifying what is working, what can be improve and incorporate any necessary changes.
- **Stage three:** At key stages **evaluate** your progress and impact and share your findings with your stakeholders.

It is important from the outset to consider how you will evaluate the effectiveness of your stakeholder engagement. As you start to set up your project, we recommend concurrently creating an evaluation framework, as illustrated in the following

[Table 3](#) (see [Tools 2.6](#) for more detail).

Table 3: Evaluation table for stakeholder engagement Mock-up

	What do you want to know?	What evaluation methods will you use?	How will the evaluation be conducted?
Planning Process	E.g. How effective is the planning process?	E.g. Assess the representativeness of community representation in the stakeholders identified and engaged	E.g. compare local population to stakeholders represented
Engagement	E.g. Are we appropriately engaging stakeholders?	E.g. levels of engagement and feedback	E.g. Feedback surveys at key stages of process and registering engagement via different methods
Benefits/Outcomes	e.g. stakeholders happy with engagement	E.g. satisfaction survey	e.g. issue a survey at the end of engagement events

When considering your methods, Durham et al. (2014) propose looking at what are the appropriate levels of participation for each stakeholder, what methods are most appropriate and effective at measuring your goals for the UIPs, CALs and NBS and their intended outcomes, and, what is a reasonable level of resource to dedicate to this.

In addition, the UNDP (2017) suggests having a grievance mechanism. Although their guidance is designed in a way that takes into account working in conflict situations, it may be worth considering having a feedback mechanism where stakeholders can raise issues and/or concerns. This can be done through feedback surveys or by designating a contact person to whom stakeholders can direct concerns.

References

- Aarikka-stenroos, L. (2016). *Value co-creation in innovation eco-systems*. Center for Innovation and Technology Management, Tampere University of Technology.
- Abbasi, M., Cullen, J., Li, C., Molinari, F., Morelli, N., Rausell, P., ... Dam, K. Van. (2019). A Triplet Under Focus: Innovation, Design and the City. In G. Concilio & I. Tosoni (Eds.), *Innovation Capacity and the City: The Enabling Role of Design* (pp. 15–40). Springer OPEN. Retrieved from <http://www.springer.com/series/11159>
- Aligica, P. D. (2006). Institutional and stakeholder mapping: Frameworks for policy analysis and institutional change. *Public Organization Review*, 6(1), 79–90. <https://doi.org/10.1007/s11115-006-6833-0>
- Arbter, K. (2012). *Praxisbuch Partizipation: Gemeinsam die Stadt entwickeln. (Practice Book Participation)*. Retrieved from <https://www.wien.gv.at/stadtentwicklung/studien/pdf/b008273.pdf>
- Arnstein, S. R. (1969). A Ladder of Citizen Participation. *JAIP*, 35(4), 216–224. Retrieved from <http://www.citizenshandbook.org/arnsteinsladder.html>
- ASHOKA. (2012). *C o-C r e a t i o n : Opening societal project governance to maximize the creation and sharing of economic and social value*. Retrieved from https://www.ashoka.org/en/file/4036/download?token=8ZWa0_3Y
- Aversano, P., Baccarne, B., & Schurman, D. (2017). Living Lab methodology.
- Bourguignon, D. (2017). *Nature-based solutions Concept, opportunities and challenges* (EPRS | European Parliamentary Research Service). Retrieved from <https://www.iucn.org/commissions/commission-ecosystem-management/our-work/nature-based-solutions>
- Brodie, E., Cowling, E., Nissen, N., Paine, A. E., Jochum, V., & Warburton, D. (2009). Understanding participation: A literature review. *Pathways through Participation*, NCVO(December), 50. <https://doi.org/ISBN:978-82-7548-773-3>
- BSR. (2011). Stakeholder Mapping. *Business for Social Responsibility (BSR)*, (November), 1–5. Retrieved from https://www.bsr.org/reports/BSR_Stakeholder_Engagement_Stakeholder_Mapping.final.pdf
- Bulkeley, H., Marvin, S., Palgan, Y. V., McCormick, K., Breitfuss-Loidl, M., Mai, L., ... Frantzeskaki, N. (2018). Urban living laboratories: Conducting the experimental city? *European Urban and Regional Studies*. <https://doi.org/10.1177/0969776418787222>
- CABE. (2004). *The Value of Public Space: How high quality parks and public spaces create economic, social and environmental value*. Cabe Space. London. Retrieved from <https://www.designcouncil.org.uk/sites/default/files/asset/document/the-value-of-public-space1.pdf>
- Carr, G. (2015). Stakeholder and public participation in river basin management-an introduction. *Wiley Interdisciplinary Reviews: Water*, 2(4), 393–405. <https://doi.org/10.1002/wat2.1086>
- Chisholm, J. (n.d.). What is co-design? Retrieved October 28, 2018, from <http://designforeurope.eu/what-co-design>
- Christopher M., R., Berry, P., Margaretha Breil, M. R. N., Kabisch, N., Bel, M. de, Enzi, V., ... Calfapietra, C. (2017). *An impact evaluation framework to support planning and evaluation of nature-based solutions projects. An EKLIPSE Expert Working Group report*. <https://doi.org/10.13140/RG.2.2.18682.08643>
- City of Athens. (2017). Redefining the city. Athens Resilience Strategy for 2030. *100 Resilient Cities*.
- City of Edmonton, Aaron Aubin Consulting Inc., & O2 Planning + Design Inc. (2017). *RIBBON of GREEN: PUBLIC ENGAGEMENT & COMMUNICATIONS PLAN*.

- Cohen-Shacham, E., Walters, G., Janzen, C., & Maginnis, S. (2016). *Nature-based solutions to address global societal challenges*. <https://doi.org/10.2305/IUCN.CH.2016.13.en>
- Connop, S., Vandergert, P., Eisenberg, B., Collier, M. J., Nash, C., Clough, J., & Newport, D. (2015). Renaturing cities using a regionally-focused biodiversity-led multifunctional benefits approach to urban green infrastructure. *Environmental Science and Policy*, 62, 99–111. <https://doi.org/10.1016/j.envsci.2016.01.013>
- Davies, A., Simon, J., Patrick, R., & Norman, W. (2012). “Mapping citizen engagement in the process of social innovation.” *A Deliverable of the Project: “The Theoretical, Empirical and Policy Foundations for Building Social Innovation in Europe” (TEPSIE), European Commission – 7th Framework Programme*, (September), 50. Retrieved from <https://youngfoundation.org/wp-content/uploads/2013/11/Mapping-citizen-engagement-in-the-process-of-social-innovation.pdf>
- Davis, M., Mederake, L., McFarland, K., McGlade, K., Skodra, J., & Moebus, S. (2018). Defining key concepts and associated indicators to measure NBS impact on urban regeneration within CLEVER Cities. In *Deliverable 1.1.4, CLEVER Cities, European Union’s Horizon 2020 Framework Programme for Research and Innovation Grant Agreement No. 776604*.
- DCLG. (2009). *Multi-criteria analysis: a manual*. London: Department for Communities and Local Government. Retrieved from http://eprints.lse.ac.uk/12761/1/Multi-criteria_Analysis.pdf
- De Lotto, R. (2017). Nature-based solutions in City Planning: the case of Segrate Municipality (Milan). *Urbanistica Informazioni.*, (Special Issue), 802–804. Retrieved from http://www.urbanisticainformazioni.it/IMG/pdf/ui_272si_11_sessione_speciale_04.pdf
- DHHS. (n.d.). Stakeholder Analysis (Venn Diagrams). Retrieved from https://www.dhhs.tas.gov.au/__data/assets/pdf_file/0019/85132/Stakeholder_Analysis_Venn_Diagrams.pdf
- Durham, E., Baker, H., Smith, M., Moore, E., & Morgan, V. (2014). *BiodivERsA Stakeholder Engagement Toolkit*. Paris. Retrieved from <http://www.biodiversa.org/stakeholderengagement>
- Ecoshape. (n.d.). Building with Nature. Retrieved from [https://publicwiki.deltares.nl/display/BTG/Building solutions](https://publicwiki.deltares.nl/display/BTG/Building+solutions)
- Eggermont, H., Balian, E., Azevedo, J. M. N., Beumer, V., Brodin, T., Claudet, J., ... Roux, X. Le. (2015). Nature-based Solutions : New Influence for Environmental Management and Research in Europe. *GAIA-Ecological Perspectives for Science and Society*, 24(4), 243–248. <https://doi.org/http://dx.doi.org/10.14512/gaia.24.4.9>
- European Commission. (2015). *Towards an EU Research and Innovation policy agenda for Nature-Based Solutions & Re-Naturing Cities*. <https://doi.org/10.2777/765301>
- Faivre, N., Fritz, M., Freitas, T., de Boissezon, B., & Vandewoestijne, S. (2017). Nature-Based Solutions in the EU: Innovating with nature to address social, economic and environmental challenges. *Environmental Research*, 159(September), 509–518. <https://doi.org/10.1016/j.envres.2017.08.032>
- Fan, P., Ouyang, Z., Basnou, C., Pino, J., Park, H., & Chen, J. (2017). Nature-based solutions for urban landscapes under post-industrialization and globalization: Barcelona versus Shanghai. *Environmental Research*, 156(December 2016), 272–283. <https://doi.org/10.1016/j.envres.2017.03.043>
- Frantzeskaki, N., & Kabisch, N. (2015). Designing a knowledge co-production operating space for urban environmental governance—Lessons from Rotterdam, Netherlands and Berlin, Germany. *Environmental Science and Policy*, 62, 90–98. <https://doi.org/10.1016/j.envsci.2016.01.010>
- Galafassi, D., Daw, T. M., Thyresson, M., Rosendo, S., Chaigneau, T., Bandeira, S., ... Brown, K. (2018). Stories in social-ecological knowledge cocreation. *Ecology and Society*, 23(1). <https://doi.org/10.5751/ES-09932-230123>

- Grime, M. M., & Wright, G. (2016). Delphi Method. In *Wiley StatsRef: Statistics Reference Online* (pp. 1–6). John Wiley & Sons. <https://doi.org/10.1002/9781118445112.stat07879>
- Hartig, T., Mitchell, R., de Vries, S., & Frumkin, H. (2014). Nature and Health. *Ssrn*, (December 2013). <https://doi.org/10.1146/annurev-publhealth-032013-182443>
- IAP2. (2014). IAP2 's Public Participation Spectrum. *International Association for Public Participation*, 2014. Retrieved from https://cdn.ymaws.com/www.iap2.org/resource/resmgr/foundations_course/IAP2_P2_Spectrum_FINAL.pdf
- IDS. (2013). Introduction to Stakeholder engagement. Retrieved from <http://www.researchtoaction.org/wp-content/uploads/2014/02/Introduction-to-Stakeholder-Engagement.pdf>
- Insight Share. (2006). Insights into Participatory Video: A Handbook for the Field. Retrieved from <https://insightshare.org/resources/insights-into-participatory-video-a-handbook-for-the-field/>
- IPCC. (2007). *CLIMATE CHANGE 2007: Mitigation. Contribution of Working Group III to the Fourth Assessment Report of the Inter- governmental Panel on Climate Change*. (B. Metz, O. Davidson, P. Bosch, R. Dave, & L. Meyer, Eds.). Cambridge, UK: Cambridge University Press. Retrieved from http://www.ipcc.ch/pdf/assessment-report/ar4/wg3/ar4_wg3_full_report.pdf
- IUCN. (2012). The IUCN Programme 2013–2016. In *IUCN World Conservation Congress* (pp. 1–30). Retrieved from https://cmsdata.iucn.org/downloads/iucn_programme_2013_2016.pdf
- Jansen, S., & Pieters, M. (2017). *The 7 Principles of Complete Co-Creation* (Vol. 40). <https://doi.org/10.3724/SP.J.1004.2014.00051>
- Kabisch, N., Frantzeskaki, N., Pauleit, S., Naumann, S., Davis, M., Artmann, M., ... Bonn, A. (2016). Nature-based solutions to climate change mitigation and adaptation in urban areas: Perspectives on indicators, knowledge gaps, barriers, and opportunities for action. *Ecology and Society*, 21(2), 39. <https://doi.org/10.5751/ES-08373-210239>
- Kabisch, N., Korn, H., Stadler, J., & Bonn, A. (2017). *Nature based Solutions to Climate Change Adaptation in Urban Areas: Linkages between Science, Policy and Practice*. Springer OPEN. Retrieved from [internal-pdf://102.93.255.14/Kabisch-Nature based Solutions to Climate Chan.pdf](internal-pdf://102.93.255.14/Kabisch-Nature%20based%20Solutions%20to%20Climate%20Chan.pdf)
- Keniger, L. E., Gaston, K. J., Irvine, K. N., & Fuller, R. A. (2013). What are the Benefits of Interacting with Nature? *International Journal of Environmental Research and Public Health*, 10, 913–935. <https://doi.org/10.3390/ijerph10030913>
- Kleine, D., Pearson, G., Poveda, S., & Holloway, R. (2016). *METHOD GUIDE 8 Participatory methods: Engaging children 's voices and experiences in*. Retrieved from <http://globalkidsonline.net/wp-content/uploads/2016/05/Guide-8-Participatory-methods-Kleine-Pearson-Poveda.pdf>
- Klimatek Project. (2017). *Nature-based solutions for local climate adaptation in the Basque Country*. Bilbao. Retrieved from <http://growgreenproject.eu/wp-content/uploads/2018/05/NBS-Climate-Adaptation-Basque-Country.pdf>
- LCIP. (2011). *A Guide to Stakeholder Mapping and Management*. London. Retrieved from <https://www.londoncouncils.gov.uk/download/file/fid/2823>
- Leung, V. A., Woiwode, N., & Smith, M. P. (2018). *A Procurement Guide to Nature-based Solutions*. Retrieved from http://nrcsolutions.org/wp-content/uploads/2018/02/NBS_Procurement_Guide.pdf
- Mauser, W., Klepper, G., Rice, M., Schmalzbauer, B. S., Hackmann, H., Leemans, R., & Moore, H. (2013). Transdisciplinary global change research: The co-creation of knowledge for sustainability. *Current Opinion in Environmental Sustainability*, 5(3–4), 420–431. <https://doi.org/10.1016/j.cosust.2013.07.001>

- Menny, M., Voytenko Palgan, Y., & McCormick, K. (2018). Urban living labs and the role of users in co-creation. *Gaia*, 27, 68–77. <https://doi.org/10.14512/gaia.27.S1.14>
- Mind Tools. (2018a). Brainstorming Generating Many Radical, Creative Ideas. Retrieved from <https://www.mindtools.com/brainstm.html>
- Mind Tools. (2018b). Mind Maps ® A Powerful Approach to Note-Taking. Retrieved from https://www.mindtools.com/pages/article/newISS_01.htm
- Miyatsuka, A., & Zusman, E. (2015). What are Co-benefits ? *ACP Fact Sheet No . 1*. Asian Co-Benefits Partnership. Retrieved from https://pub.iges.or.jp/system/files/publication_documents/pub/nonpeer/2393/acp_factsheet_1_what_co-benefits.pdf
- Naumann, S., Kaphengst, T., McFarland, K., & Stadler, J. (2014). *Nature-based mitigation climate change approaches for and adaptation*. German Federal Agency for Nature Conservation,. Bonn.
- NCCPE. (n.d.). Panels and user groups. Retrieved from <http://www.publicengagement.ac.uk/do-engagement/choose-method/consultation/panels-and-user-groups>
- Nesshöver, C., Assmuth, T., Irvine, K. N., Rusch, G. M., Waylen, K. A., Delbaere, B., ... Wittmer, H. (2017). Science of the Total Environment The science , policy and practice of nature-based solutions : An interdisciplinary perspective. *Science of the Total Environment*, 579, 1215–1227. <https://doi.org/10.1016/j.scitotenv.2016.11.106>
- ODI. (2009). Planning tools: Problem Tree Analysis. Retrieved from <https://www.odi.org/publications/5258-problem-tree-analysis>
- Panno, A., Carrus, G., Laforteza, R., Mariani, L. and, & Sanesi, G. (2017). Nature-based solutions to promote human resilience and wellbeing in cities during increasingly hot summers. *Environmental Research*, 159(November 2016), 249–256. <https://doi.org/10.1016/j.envres.2017.08.016>
- Parks, S., D'Angelo, C., & Gunashekar, S. (2018). *Citizen science: generating ideas and exploring consensus*. (R. EUROPE, Ed.). Cambridge, UK: The Healthcare Improvement Studies Institute. Retrieved from <https://www.thisinstitute.cam.ac.uk/using-citizen-science-to-generate-ideas-and-build-consensus-explored-in-new-report/>
- Parsons, M., Fisher, K., & Nalau, J. (2016). Alternative approaches to co-design: insights from indigenous/academic research collaborations. *Current Opinion in Environmental Sustainability*, 20, 99–105. <https://doi.org/10.1016/j.cosust.2016.07.001>
- Pastak, I., & Kährlik, A. (2016). Impacts of culture-led flagship projects on local communities in the context of post-socialist Tallinn. *Czech Sociological Review*, 52(6). <https://doi.org/10.13060/00380288.2016.52.6.292>
- Pater, M. (2009). *CO-CREATION'S 5 Guiding Principles* (No. 1). *Fronteer Strategy*. Retrieved from https://naaee.org/sites/default/files/fs_whitepaper1-co-creation_5_guiding_principles-april2009.pdf
- Pauleit, S., Zölch, T., Hansen, R., Randrup, T. B., & Konijnendijk van den Bosch, C. (2017). Nature-Based Solutions and Climate Change – Four Shades of Green. In *Nature based Solutions to Climate Change Adaptation in Urban Areas: Linkages between Science, Policy and Practice* (pp. 29–49). Springer. https://doi.org/10.1007/978-3-319-56091-5_3
- Preston City Council. (2017). *The Community Mapping Toolkit*. Retrieved from <https://www.preston.gov.uk/GetAsset.aspx?id=fAAxADMAMQA2ADUAfAB8AFQAcgB1AGUAfAB8ADAAfAA1>
- Puerari, E., Koning, J. I. J. C. De, Von Wirth, T., Karré, P. M., Mulder, I. J., & Loorbach, D. A. (2018). Co-Creation Dynamics in Urban Living Labs. *Sustainability*, 10(1893), 1–18. <https://doi.org/10.3390/su10061893>

- Raymond, C. M., Frantzeskaki, N., Kabisch, N., Berry, P., Breil, M., Nita, M. R., ... Calfapietra, C. (2017). A framework for assessing and implementing the co-benefits of nature-based solutions in urban areas. *Environmental Science and Policy*, 77(June), 15–24. <https://doi.org/10.1016/j.envsci.2017.07.008>
- Robertson, T., & Lepik, C. (2013). *Public Engagement Handbook*. Kamloops. Retrieved from <https://www.kamloops.ca/sites/default/files/docs/our-community/publicengagementhandbook.pdf>
- Rock, J., McGuire, M., & Rogers, A. (2018). Multidisciplinary Perspectives on Co-creation. *Science Communication*, 107554701878149. <https://doi.org/10.1177/1075547018781496>
- Sanders, E. B.-N., & Stappers, P. J. (2008). Co-creation and the new landscapes of design. *Journal of CoDesign*, 4(1), 5–18. <https://doi.org/10.1080/15710880701875068>
- Schumacher, J. (2011). Alcotra Innovation project : Living Labs Definition , Harmonization Cube Indicators, 1–24.
- Shanahan, D. F., Fuller, R. A., Bush, R., Lin, B. B., & Gaston, K. J. (2015). The health benefits of urban nature: How much do we need? *BioScience*, 65(5), 476–485. <https://doi.org/10.1093/biosci/biv032>
- Smith, A. (2013). *The Climate Bonus: Co-benefits of Climate Policy*. Taylor & Francis. Retrieved from <https://www.book2look.com/embed/9781136271151>
- Stix, A. (2012). Stix Pix for the interactive classroom. Retrieved from http://www.andistix.com/carousel_brainstorming
- Susanne Walz, Kast, A., Schulze, G., Born, L., Krüger, K., Niggemeier, K., ... Schilling, P. (2012). *Handbuch zur Partizipation*. Berlin. Retrieved from https://www.stadtentwicklung.berlin.de/soziale_stadt/partizipation/download/Handbuch_Partizipation.pdf
- Tallon, A. (2013). *Urban Regeneration in the UK* (2nd ed.). Oxford: Routledge. Retrieved from <http://www.gbv.de/dms/tib-ub-hannover/726848530.pdf>
- UIA. (2018). Sustainable use of land, nature based solutions. Retrieved from <https://www.uia-initiative.eu/en/sustainable-use-land-nature-based-solutions>
- UN-HABITAT. (2018). *City Resilience Profiling Tool Guide*. Retrieved from www.unhabitat.org/urbanresilience
- UNDP. (2017). *UNDP Guidance Notes on the Social and Environmental Standards (SES): Stakeholder Engagement*. Retrieved from https://info.undp.org/sites/bpps/SES_Toolkit/SES_Document_Library/Uploaded_October_2016/Final_UNDP_SES_Stakeholder_Engagement_GN_Oct2017.pdf
- UNICEF. (2016). Module_1: What are the Social Ecological Model (SEM), Communication for Development (C4D)?'. Retrieved from www.unicef.org/cbsc/files/Module_1_SEM-C4D.docx
- UrbanGreenUP. (n.d.). NBS SOLUTIONS. Retrieved from <http://www.urbangreenup.eu/solutions/>
- Velea, S., & Alexandru, M. (2017). *PhotoVoice Connector*. Retrieved from https://www.erasmusplus.ro/library/files/Ghiduri_Connector_2017/PhotoVoice_Connector_2017.pdf
- Vickery, J. (2007). Regeneration: an urban design framework. In *The Emergence of Culture-led Regeneration: A policy concept and its discontents* (p. 106). Centre for Cultural Policy Studies.
- Walters, G., Janzen, C., & Maginnis, S. (2016). *Nature-based solutions to address global societal challenges*. <https://doi.org/10.2305/IUCN.CH.2016.13.en>
- Williams, D., Atkinson, R., & Tallon, A. (2017). Who is responsible for incorporating the notion of 'public interest' into sustainable urban developments? A case study of three sites in the south-west of England. In: *49th Annual UTSG Conference* (Vol. 1, pp. 1188–1197). Dublin. <https://doi.org/10.1111/j.1469-7610.2010.02280.x>

Xing, Y., Jones, P., & Donnison, I. (2017). Characterisation of nature-based solutions for the built environment. *Sustainability (Switzerland)*, 9(1), 1–20. <https://doi.org/10.3390/su9010149>

Annex 1: CLEVER Cities Glossary

It is fundamental to create a shared glossary of terms. CLEVER Cities proposes a series of acronyms which will be recurrent across the co-creation path. Moreover, a series of Nature Bases Solutions related definitions are common terms along the guidance and the suggested literature.

CLEVER Cities Definitions

	Definition
CAL	<p>CLEVER Action Laboratory</p> <p>CLEVER Action Labs (CAL) will co-design, co-implement and co-manage NBS interventions in the deprived districts starting from specific place-based NBS technologies as impulses.</p> <p>Each UIP supports one or more CLEVER Action Labs (CAL) as alliances of locally involved actors specifically interested or relevant to realise place-based NBS interventions 'on site' with one specific CLEVER Stimulus.</p>
UIP	<p>Urban Innovation Partnership</p> <p>A city-wide or district-focused informal alliance of local and city authorities, community (groups), businesses, academics to promote the NBS for regeneration or urban transformation, facilitate and drive the co-creation process. More specifically, each UIP supports one or more CLEVER Action Labs (CAL).</p>
FR Cities	<p>Front Runner Cities</p> <p>Hamburg, London and Milan as FR will be 'real world' arenas in which CLEVER Stimuli are piloted to test NBS-related technical, social, governance and economic innovations and assess their effectiveness in addressing 4 key urban regeneration challenges, FR will mentor FE on developing urban NBS plans and corresponding steps and considerations to make.</p>
FE Cities	<p>Fellow Cities</p> <p>Belgrade, Larissa, Madrid, Malmö, Sfântu Gheorghe and Quito will allow CLEVER Cities to draw meaningful insights on what it takes to effectively set up and implement a replication process for CLEVER Stimuli contexts. FE will exchange with FR to develop NBS urban plans for CLEVER Stimuli replication.</p>
Co-design	<p>Co-design is an approach rooted in participatory design techniques. It presents a fundamental change in the traditional designer-client relationship. It aims at allowing the creative contribution of all affected stakeholders in the formulation and solution of a problem, see (Abbasi et al., 2019)</p>

Nature-based Solutions related definitions

	Definition
NBS	<p>Nature Based Solutions</p> <p>NBS are solutions to societal challenges that are inspired and supported by nature, which are cost- effective, provide simultaneous environmental, social and economic benefits, and help build resilience. Such solutions bring more, and more diverse, nature and natural features and processes into cities, landscapes and seascapes, through locally adapted, resource- efficient and systemic interventions.</p>
EBA	<p>Ecosystem Based Adaptation</p> <p>The concept of EbA is defined as “the use of biodiversity and ecosystem services as part of an overall adaptation strategy to help people adapt to the adverse effects of climate change” For more, refer to (Pauleit, Zölch, Hansen, Randrup, & Konijnendijk van den Bosch, 2017, p. 33)</p>
ESS	<p>Ecosystem Services</p> <p>The direct and indirect contributions of ecosystems to human wellbeing. Examples include provisioning services (providing food, wood, water, medicine); regulating services (regulating climate and air quality, storing carbon, protecting against extreme weather events, preventing soil erosion, treating waste water, pollinating); cultural services (recreation and tourism); and habitat services (providing species with habitat).</p>
UCI	<p>Urban Green Infrastructure</p> <p>Strategically planned natural and semi-natural areas with environmental features designed and managed to deliver a wide range of ecosystem services. May be situated in marine areas (where it is called 'blue infrastructure'), or on land, both in rural and urban settings (where it is called 'green infrastructure'). For practical purposes, the concept is often similar to 'nature-based solutions', albeit with a narrower focus. For more refer to (Bourguignon, 2017)</p>

Annex 2: Nature-based Solutions Catalogue

Please, from the hyperlink below you can download a catalogue of proposed Nature-based Solutions to be used in conjunction with the Toolkit during the co-creation activities of the CLEVER Cities Project.

<https://clevercitiesguidance.files.wordpress.com/2018/11/nbs-catalogue.pdf>