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Activated Cities Through Integrated Nature-Based Solutions (ACT on NBS) (Work Package 2)

Enablers for Nature-Based Solutions - from the perspective of the ACT on NBS city network

2019

Figure 1: Zurich, Münsterhof (Photo Credit: Stadt Zürich)
Details

Prepared by:

Global Infrastructure Basel Foundation (GIB)
Elisabethenstrasse 22, 4051 Basel, Switzerland
http://www.gib-foundation.org

IRE spa – regional agency for Infrastructures, urban Regeneration and Energy of Liguria
Via XX Settembre 41, 16121 Genoa, Italy
www.ireliguria.it

Alma Mater Studiorum – Università di Bologna
Department of Architecture
Viale Risorgimento 2, 40136, Bologna, Italy
http://www.da.unibo.it

Authors of the report:

Juraj Jurík
Director, Nature-Based Solutions
+41 61 205 10 63
juraj.jurik@gib-foundation.org

Louis Downing
CEO
+41 61 205 10 49
louis.downing@gib-foundation.org

Michela Fossa
EU projects expert
+39 010 548 8722
fossa@ireliguria.it

Robert Casapietra
Manager of EU projects
+39 010 548 8725
casapietra@ireliguria.it

Claudia de Luca
PhD Candidate
Claudia.deluca5@unibo.it
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Executive Summary

Air quality, water security, biological diversity and human health & wellbeing are at the heart of liveable and prosperous societies. However, densification of the urban environment, challenges in transport and mobility, increased pollution (e.g. air, water, soil) and climate change-induced impacts (e.g. flooding, heat island, draughts) are negatively affecting the essentials upon which human life depends and flourish.

Nature-Based Solutions (NBS), a novel concept, defined as actions inspired by, supported by, or copied from nature (Cohen-Shacham et al., 2016; EC, 2015) are seen as solutions that can address the societal challenges such as the hazards of climate change, loss of biodiversity and unsustainable patterns of urbanization in an effective and sustainable way.

Forests, wetlands, floodplains, urban parks & gardens, urban rain gardens, green tramlines, green roofs & facades are some of the solutions that could be applied to create a range of benefits for cities and communities. For example, an urban rain garden can, on one hand, increase the water retention capacity of the environment and hence mitigate flooding, on the other hand, it can simultaneously provide other co-benefits such as the provision of habitat for biodiversity (e.g. insect, bird species), and mitigation of heat island effect by decreasing the albedo of the urban landscape.

NBS are key to achieving the objectives of the European policies such as the Water Directive, Cohesion Policy, EU Adaptation Strategy as well as the high-level global agenda for sustainable development such as the Sustainable Development Goals (SDGs), Aichi Biodiversity Targets and the Convention on Biological Diversity (CBD). Furthermore, since achieving most of the SDGs will require actions that would lead to the improvement of the natural environment and/or elements of human wellbeing NBS are seen as one of the most promising solutions available.

This report explores how Nature-Based Solutions (NBS) could contribute to addressing Europe's urgent environmental and social challenges and what are the key enablers for NBS within the municipal administration. There are many interesting pilot NBS projects in Europe that have been implemented, however, to the majority of the European cities NBS are still a novel concept they have little to no experience with.

The goal of this report is not to investigate barriers & drivers for NBS implementation (Refer to: Barriers Landscape and Decision-Making Hierarchy for the Sustainable Urbanisation in Cities via NBS) nor the technical aspects of the solutions themselves (Refer to: Handbook for NBS; Naturvation: Urban Nature Atlas) since such aspects have been already sufficiently explored in other projects. However, the report briefly touches upon these themes when needed to reflect the specific practices and barriers of the interviewed cities.

The overall objective of this report is rather to explore the practical experiences of the ACT on NBS city network that

1 ThinkNature Handbook for NBS is one of the most comprehensive materials on the topic to the date touching upon a variety of key topics.
2 The Urban Nature Atlas, created as part of the NATURVATION project, is the most comprehensive database of Nature Based Solutions (NBS) for cities created to date. The Urban Nature Atlas has been produced as the result of a systematic survey of NBS interventions in 100 European cities and provides the basis for the analysis of socio-economic and innovation patterns associated with urban NBS in Europe.
could pave the way to the concept adoption and mainstreaming in cities that are either experienced in NBS but looking to learn more or having little or no experience and would like to make a first step. The report should also serve the project as a resource for the capacity building workshops, webinars and technical assistance that will occur in the year of 2020 and 2021. The bases for the report are:

1. ACT on NBS city interviews conducted with a number of European cities in 2019;
2. A review of state-of-the-art literature on NBS;
3. A workshop convened in Nicosia in Cyprus with the local municipalities;
4. A conference in Slovakia focused on local municipalities and the application of the NBS concept.

It is important to note that the cities which were interviewed have different experiences with NBS. Some of them are at the forefront among European cities whereas the others have just recently started.

The report’s main objectives are:

- To identify the main challenges (e.g. social, environmental and health) European cities are currently facing and the role that NBS can play in tackling these challenges.
- To extract the lessons learned from on-the-ground experiences of the ACT on NBS city network in Planning, Strategy, Legislation & Financing, Co-creation & Citizen Participation and Stakeholder Engagement, Collaboration & Education. The interviews are complemented by desk-based research of state-of-the-art literature on the topic.
- To formulate recommendations on what needs to be done to mainstream and up-scale NBS and what can be done differently.

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3 Experts working for municipalities such as urban planners, sustainability professionals, climate officers, health officers, project developers and ecologist were approached.
4 Green Infrastructure and Biodiversity in Cities and beyond (October 2019)
Introduction

The ACT on NBS project arose from the need to address the environmental, social and economic challenges of the cities in the project network. Globally, cities are becoming increasingly aware that the current challenges cannot be solved by developing more engineered or hi-tech technologies. The essential cause of many problems confronting these cities is linked to the lack of the natural environment. The only solution is to bring nature back, so the essential ecosystem services can be restored. In 2018, the United Nations reported that 85% of the world’s largest cities are experiencing major climate issues from extreme heat and drought to floods, however, 46% of these cities reported that they have taken no action so far (Klein, 2019). The ACT on NBS city network was formed to promote the exchange of knowledge, and to strengthen international collaboration between different European and non-European cities about adapting to climate change.

Modern society depends heavily on fossil fuels in order to provide essential goods and services including the provision of food, mobility, transport and health care to name few.

Increased greenhouse gas emissions have had a severe impact on climate. Changing climate patterns result in cities experiencing more frequent flooding, longer and more severe heat waves and heat island effects. Since 2000, there were more than 100 major floods throughout Europe, causing the loss of more than 700 lives and more than EUR 25 billion in insured economic losses (EEA, 2018). In 2018, Europe also experienced one of the worst droughts in the 21st century (Munich Re, 2018), which affected agriculture, fisheries, tourism as well as the energy sector.

Humans have conquered nature in many ways and taken over a significant proportion of the Earth’s land. Human inhabited land is either urbanised or used for food production. According to OurWorldInData (2019), over 30% of the Earth’s terrestrial areas are taken by Agriculture and Urban & Built-up areas (Figure 2). This means an equivalent loss of natural ecosystems which used to provide vital services such as regulation of climate, provision of clean water and sequestration of CO₂ emissions. Industrialised society emits an ever-increasing amount of greenhouse gases into the atmosphere whilst simultaneously diminishing the natural ecosystems which are able to mitigate these emissions. Climate change is accelerated by this symbiosis.

As a result of habitat loss and aggressive urbanisation, cities face a tremendous loss of biodiversity and lack essential green spaces which are essential for urban drainage, ambient temperature control as well as provision of spaces for recreation & sport. If urbanisation continues at this aggressive pace unchallenged, it will have a detrimental effect on human health and wellbeing, and also to the sustainable and equitable development of our society as climate change disproportionately affects the poor and vulnerable.

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Figure 2 Global Land use for Food Production (Credit: OurWorldInData.org; Source: UN Food and Agriculture Organisation (FAO))
There are other risks induced by climate change which may have a detrimental impact on infrastructure systems. The world’s population is projected to reach 9.8 billion by 2050 and 11.2 billion by 2100 (UN, 2017; WWF-US, 2017). This unprecedented increase in population means that infrastructure capacity will also need to increase accordingly if it is to deliver various services successfully, such as telecommunications, energy, transportation, water treatment and waste management, health, and education. Given the mounting challenges posed by climate change and rapid urbanisation, it is more important than ever to address project resilience. This means designing projects to resist the shocks and stresses they may be exposed to, and ensuring that projects contribute to the overall resilience of the surrounding communities and systems where they are implemented.

These complex challenges call for synergistic solutions which will work across different sectors to create a healthier, more equitable and sustainable urban fabric leading to healthier and more resilient and inclusive cities and communities. Nature-Based Solutions are designed to retain the natural environment and integrate it with infrastructural development in cities, landscapes and areas.

Urban parks significantly contribute to the quality of the urban environment by reducing pollution levels, controlling temperature through evapotranspiration and shading, reducing ambient noise levels and providing people with high quality green spaces for sport and recreation.

NBS are often recognized as innovative solutions to boost the capacity of cities to face current and future environmental, climate-related and societal challenges. These solutions also provide opportunities for ‘renaturing the city’ and for building and sustaining engaging places for people to gather, socialize, and be active, having ‘co-benefits’ for the environment, public health (e.g. through access to green space and improved air quality) and society. NBS can integrate resilience and sustainability considerations into infrastructure and offer substantial economic and ecological performance benefits. There are indeed many reasons why NBS should be considered.
‘infrastructure’. In some cases, NBS provide similar or the same services and performance levels as conventional infrastructure systems. For example, a conventional wastewater treatment plant could be partly or fully substituted by constructed or natural wetlands. We refer to such natural counterparts as ‘Natural Infrastructure’6. Other examples of nature as ‘infrastructure’ may include provision of food (urban gardening), social infrastructure (urban parks for recreation, education, etc.).

The successful implementation of the Sustainable Development Goals (SDGs) depends heavily on the provision of a wide variety of ecosystem services and the equitable distribution of such services through society. 41 targets underlying 12 SDGs focus directly on improving the environment and/or dimensions of human well-being (e.g. health, poverty, nutrition, spirituality) which are entry points for NBS (Wood, 2017). NBS are therefore key solutions to achieving the 2030 agenda for sustainable development.

City Specific Challenges
During our engagement with the project cities, representatives identified the following common challenges related to their urban environments:

- **Heat waves** (also an increase in the number of tropical nights occurring per annum)
- **Flooding** (both pluvial and fluvial)
- **Long periods of drought**
- **Air pollution**
- **General decrease in human health & wellbeing in connection with the lack**

6 Natural Infrastructure is “[the] network of natural and designed or managed vegetation occurring within the public and private realm. Often used to describe vegetation in cities and towns, it includes remnant vegetation, public parks, private gardens, recreational areas, street trees, and green roofs and walls” (WWF, 2017, p. 5).

7 When the temperature does not fall under 20 C during the night time.

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For example, the city of Prague is reporting an increase in the average air temperature by 1.3 degrees in the period of 1911 – 2010 which is a significant increase in such a short period of time. The city also reports longer periods of drought and strong pluvial and fluvial flooding events.

![Figure 4 annual average air temperature in the period of 1775–2015](Credit: The Prague Adaptation Strategy; Source of data ČHMÚ, 2016, portal.chmi.cz a infomet.cz.)

In Milan, the average temperature has increased by 2 degree Celsius between 1901 – 2017 and it might increase by an additional 2 degrees by 2050. In the same period of time, Milan experienced a significant increase in the number of tropical nights from 15 to 50 and it is expected this number will increase by 25 nights by 2050, reaching an average of 75 tropical nights per year.

The cities recognise NBS as an effective tool to address these challenges. City specific challenges are described in more detail on the project website: (www.naturebasedcity.climate-kic.org).

Box 1 – Most common city challenges
Nature-Based Solutions Enablers

The interviews conducted with the “ACT on NBS” city network in 2019, coupled with extensive desk-based research, have highlighted three key topics that are of particular interest and importance for cities willing to implement Nature-Based Solutions (NBS) on their territory: Co-creation and Stakeholder Engagement; Planning, Strategy and Legislation; and Innovative Financial Mechanisms and Tools. This chapter elaborates on these three crucial enablers for the diffusion of NBS and describes best practices for each.

Co-creation and Stakeholder Engagement

Co-creation and stakeholder engagement are key elements of properly planned NBS. Involvement of key actors is absolutely essential to plan and design NBS that can provide multiple benefits as well as be supported by the local communities.

What is co-creation?

Today, citizens and urban policy makers are experimenting with new collaborative approaches to tackle persistent urban issues such as climate change adaptation, quality of life and urban inequalities (Puerari et al., 2018). Local governments have been opening up towards participatory practices, while at the same time the desire of various urban actors to have a voice in public decisions has grown. Together, they are joining forces and contributing to co-create the cities of the future: sustainable, inclusive and resilient urban spaces where the inhabitants are healthy, happy and empowered. As cities are facing challenges on an unprecedented scale, it has become evident how solutions are better found through cooperation among stakeholders rather than in isolation, and how vital it is to involve the people who live and work in these cities in the process.

Co-creation can be defined as a collaborative governance approach that requires the active engagement and combined efforts of various actors with different types of knowledge, aiming to generate collaborative and mutually beneficial outputs and outcomes. In it, stakeholders from diverse sectors (policy, civil society, businesses, academia, etc.) come together to interact and collaborate in an innovative way to define problems, find and jointly implement solutions. Drawing on the guiding principles outlined by a recent EU-funded project (H2020 Connecting Nature), we can define a good co-creation process as one that is inclusive, legitimate and open; its co-produced outputs are valued and taken up by the different urban actors, immediately translated into policy and planning and are connected to multiple goals and strategies within the city.

Drawing on “Arnstein’s Ladder” (Arnstein, 1969), the well-known classification of participation in which the ladder’s eight rungs are associated with increasing shifts in power towards participants, we can identify three main levels of citizen participation: one where citizens have no power or voice in public decision making; the second where they are somewhat involved and made to believe that they can participate in decisions; and a third level where citizens are truly empowered. This classification can be summarized in the figure below: a good co-creation process sits right at the top of the triangle.
The benefits of using co-creation in cities are many. First, co-creation promotes democratization, as it starts from the assumption that we are all equal, as equally valuable as the knowledge we possess. Compared to other public participation or consultation methods, in which citizens and other stakeholders in the community are involved on a one-off basis or are stuck in an asymmetrical relationship with the public body managing the process, co-creation is a symmetrical and mutually beneficial process where the sharing of expertise can help all participating parties flourish. When done well, co-creation untaps innovation and can break down barriers: between the public and the private, between citizens and academia or the municipality, and so on. It also helps build a sense of community, a community that does not disperse after a single meeting but is available and willing to cooperate with the city for longer stretches of time. Citizens and other local stakeholders can, for example, take part in the entire co-design phase, but ideally can also play a role in the subsequent phases of co-implementation, co-monitoring and co-maintenance of the chosen innovative interventions. This direct involvement contributes to building consensus and reducing the possibility of conflicts, also providing an opportunity for cultural growth for all parties involved. As a result, it’s easy to see how co-creation can help cities tackle some of the main challenges it is facing today, for example problems associated with urban regeneration projects, which typically tend to alienate the existing local communities.

Co-creation is a complex process and should not be improvised. For it to be successful, public bodies should be properly trained and ask for the support of professional facilitators. In general, any government wanting to leverage and engage in a co-creation process should first clarify its objectives and processes, define the benefits and co-benefits of the envisioned interventions and carefully identify and map the stakeholders it wants to involve. It should then choose the type of approach and interaction that is most appropriate for their context and local culture and ensure that there are enough resources to carry it out. Only then can the proper co-creation work with citizens start.

Co-creating NBS

Co-creation is especially valuable in the implementation of Nature-Based Solutions in urban contexts. NBS are approaches that use nature to help address a human or community need (Leung, Woiwode and Smith, 2018); they are aimed at and used by the local communities, which therefore need to be actively engaged and involved since the very beginning in their co-design to ensure their successful delivery. Nature-Based Solutions specifically call for a co-creation approach, as their innovative and multifunctional character requires different types of knowledge as well as multiple actors working together in long-lasting partnerships. They provide a wonderful opportunity for involving unusual stakeholders and bringing communities together, joining forces and cooperating to plan, design and in the best cases also implement and maintain innovative interventions.
Co-creating NBS has multiple faces and facets and different approaches and examples exist on how to go about it. Since we are still in the experimental phase, it is important for the cities to share experiences and learn from each other in order to find when and how to do it. Some interesting case studies from within the “ACT on NBS” city network are cited below.

Case studies

The city of Genoa (IT) is experimenting and demonstrating NBS via the establishment of an Urban Living Lab (ULL), a particular collaboration model building on the concept of the Living Lab (LL) (Bergvall-Karebrn & Stahlbrost, 2009) and applied to the city or urban area. It does so alongside the cities of Eindhoven (NL) and Tampere (FI) in the framework of the H2020 “UNALAB” project (2016-2020), aiming to demonstrate innovative NBS for water management in deprived urban districts. In this context, the city of Genoa can be seen as a living laboratory in which citizens and other key stakeholders are actively involved in the process of designing, developing, implementing, testing and evaluating the innovation using nature-based solutions (Veeckman, 2015). Currently, Genoa is applying the ULL model combined with the EASW vision development method developed by the European Commission to stimulate societal carrying capacity for innovative co-creation. According to this method, participants meet in roundtables to exchange views, develop a shared vision of the future of their local community and propose ideas on how to achieve it by answering a number of structured questions. Up to now three workshops have taken place in the city, bringing together citizens, representatives of local associations, urban planners, geology experts and the Municipality staff and allowing for the shaping of a clear and shared pathway for the restoration of the city’s demonstration district through NBS.

The city of Turin (IT) is engaging citizens in a co-creation process in the framework of the H2020 “PROGIREG” project (2018-2023), which aims at creating productive green infrastructures in post-industrial districts through the use of NBS in the front runner cities of Dortmund (NL), Turin and Zagreb (HR). Living Labs are being established in the three cities to develop, test and implement eight different solutions. In Turin, the living lab’s information centre is located in the chosen District’s local school, which will also serve as a base for testing the innovative solutions. This will hopefully enable the development of a new school-civic centre model. To date, Turin has organized a few internal co-design meetings among local project partners as well as one public event in which citizens were called to give inputs and ideas on the topic of vegetable gardens, which is among the main activities envisaged by the project.

The city of Milan (IT) is experimenting with co-creating NBS through the H2020 “CLEVER CITIES” project, aiming to drive a new kind of nature-based urban transformation for sustainable and socially inclusive cities through exchange between cities, inclusive collaboration and multidisciplinary learning. The project is community driven and the implementation of NBS in the demonstration districts of Milan, Hamburg (NL) and London (UK) is carried out through the creation of collaborative local teams including citizens, businesses, knowledge partners and local authorities. Each city has created an Urban Innovation Partnership (UIP), an informal alliance of local and city authorities, community, businesses and academics to promote NBS and facilitate and drive the co-creation process. UIPs are
defined at a city level, and each of them in turn supports one or more CLEVER Action Labs (CAL). In Milan, three Action Labs have been created to plan and implement NBS interventions in buildings (green roofs and walls), infrastructures (railway), and neighbourhoods (public green areas). Stakeholders and citizens are being involved in various ways: through an awareness raising campaign for the promotion of green roofs and walls, making use of best practice city tours and training courses for professionals and of an interactive web platform for citizens; in the co-creation of a new public park with the neighbourhood’s citizens, also experimenting with innovative ways of co-management and co-maintenance of such a space; and in the creation of green areas in a local railway station, through the direct involvement of commuters. The “Clever Cities” project has also created a guidance for the co-creation of Nature Based Solutions in cities.

Switzerland has also implemented co-creation strategies in order to mitigate climate change related impacts such as increased heat and loss of biodiversity (Figure 6). For example, the city of Basel has launched its local strategy “Together for a good urban climate”. The city is encouraging citizens to take the action to

1. Establish biodiversity oases on their balconies or window ledges;
2. Turning privately owned gardens into green and biodiversity rich places.

The city is providing recommendations on appropriate native plant species, management and maintenance so these green places can support a diverse range of insect and bird species.

![Figure 6 Current and future heat island, cooling green spaces and important urban cooling corridors in the city of Basel, Switzerland (Source: Klimaschutz.bs.ch).](image)

**Emotional Maps**

Emotional maps allow co-creation with citizens on variety of different topics that relate to public space management. They are sometimes called “GeoParticipation” tools. Emotional maps provide social engagement, strengthen involvement of citizens in planning and decision-making and hence create a feeling of belonging to the community (Páněk, 2016).

The maps allow municipalities to collect city/location specific information about the urban environment from the perspective of citizens. In general, there are 2 kinds of emotional maps (pocitovemapy.cz):

1. An online map – citizens express opinions through the online app;
2. In personal meetings/workshops of city representatives and citizens by using a physical map.

Typically, an emotional map consists of a set of 5-7 questions asking about how comfortable people feel, where do they do different sport activities or where do they see any issues.

The city of Prague, specifically the Prague 6 suburb, has been experimenting with the concept of emotional maps in recent years.
The main objective of the emotional map was to target the heat island effect which is seriously affecting the city and quality of human life and wellbeing in recent years. The city also aimed to complement the climate adaptation plan that was released in 2017 and to come up with concrete interventions that the city could implement. Prague 6 designed a set of questions and provided tools to citizens so they could indicate where they feel extreme heat or dryness, which areas they consider dangerous or where they think the greenery is of a poor quality. They could have also proposed more trees or shrubs in places that they considered hostile or lacking green elements.

The city of **Warsaw** is also experimenting with an approach that is a combination of a co-creation and emotional maps. Residents of Warsaw can decide on the locations where they would like to see new trees. The “Milion drzew” (A million trees) mobile app is available for that purpose. Nearly 10,500 requests were submitted between March and November 2018. Every citizen could propose an area where he/she would like to see a tree. If there are no obstacles a tree is planted. An obstacle might be the land ownership or existing underground infrastructure that could be damaged by disturbing the soil. The city has also allocated 177 drinking water fountains in schools in 2019 and citizen were also involved in the process of deciding on the most appropriate locations. An additional 200 fountains will be implemented in 2020.
Planning, Strategy and Legislation

Policy instruments provide guidelines, incentives as well as regulation that can either enable or hamper NBS implementation. A rigorous planning process, which adopts a long-term view, is needed for the design and acceptance of policies to enable NBS, which will benefit a range of stakeholders.

From the interviews and the desk-based research we have conducted it is clear that international agreements such as the Sustainable Development Goals (SDGs) or the New Urban Agenda are paving the way for most of the EU cities in the study.

Reflecting on these international policies as well as local challenges, cities have been developing local climate adaptation plans and other local policies to address more effectively and systematically the current challenges. This is also a good moment to come up with some local policies and strategies that can make room for NBS and enhance sustainability of a city.

New Urban Agenda

The Sustainable Development Goals (SDGs) are the main reference point at international level to work and cooperate towards sustainable development. At national and local level, the SDG framework is inchoate: the SDGs are mentioned as targets in many national policies and regulation, but an overall strategy to achieve them is currently missing in most EU countries.

At the same time, also as defined in the New Urban Agenda, adopted at the United Nations Conference on Housing and Sustainable Urban Development (Habitat III) in Quito, Ecuador on 20 October 2016, it is crucial to build a shared vision on important urban challenges and questions, such as how to plan and manage cities, towns and villages for sustainable development.

The New Urban Agenda presents a paradigm shift based on the science of cities; it lays out standards and principles for the planning, construction, development, management, and improvement of urban areas along its five main pillars of implementation: national urban policies, urban legislation and regulations, urban planning and design, local economy and municipal finance, and local implementation. Among the main Urban Agenda objectives there is the following:

I. Adopt sustainable, people-centred, age- and gender-responsive and integrated approaches to urban and territorial development by implementing policies, strategies, capacity development and actions at all levels, based on fundamental drivers of change, including:

II. Developing and implementing urban policies at the appropriate level, including in local national and multi-stakeholder partnerships, building integrated systems of cities and human settlements and promoting cooperation among all levels of government to enable the achievement of sustainable integrated urban development;

III. Strengthening urban governance, with sound institutions and mechanisms which empower and include urban stakeholders, as well as appropriate checks and balances. These will provide predictability and coherence in urban development plans to enable social inclusion, and sustainable economic growth and environmental protection;

IV. Reinvigorating long-term and integrated urban and territorial...
planning and design in order to optimize the spatial dimension of the urban form and deliver the positive outcomes of urbanization.

The conference on the New Urban Agenda elaborates mostly on SDG #11 Make cities and human settlements inclusive, safe, resilient, and sustainable, but urban matters involve several other SDGs such as SDG #3 Good health and wellbeing, SDG #5 Gender equality, SDG #13 Climate Action.

Sustainable urban planning is considered as one of the most crucial mechanisms to achieve the New Urban Agenda and related Sustainable Development Goals. Within this framework, an efficient and well-planned re-introduction and integration of nature into our cities will make a positive contribution to reach these goals.

The EU context and cities’ climate Change Adaptation Plans

Although the European Commission has no direct responsibility in cities, there are various initiatives that directly involve cities and local policies at EU level. For instance, the EU Urban Agenda, calls for a better coordination and support from cities in defining urban priorities and cities’ adaptation to climate change is one of the priority themes to be addressed under this framework.

The Covenant of Mayors for Climate and Energy is an international alliance of cities and local governments with a shared long-term vision of promoting and supporting voluntary action to combat climate change and move to a low emission, resilient society. Cities which are committed to develop local climate adaptation plans defining local challenges and priorities to boost climate adaptation. The full process to set-up a local adaptation plan is described fully on the Climate-Adapt website, together with some relevant examples from cities all around the EU.

A step-by-step process (Urban Adaptation Support Tool) was designed by the Covenant of Mayors to support cities in developing their local adaptation plans. The support tool invites cities to undertake the following steps:

1. Getting started (better understanding the overall climate change issue, principles and factors);
2. Preparing the ground for adaptation (getting political support and identifying main stakeholders and funding sources);
3. Assessing climate change risks and vulnerabilities;
4. Identifying adaptation options;
5. Assessing and selecting adaptation options;
6. Implementing adaptation;
7. Monitoring and evaluating adaptation.

Many cities start to respond to the changing climate by developing Climate Adaptation Plans. Such plans describe the challenges and the opportunities. Typically, a climate adaptation plan is followed by a more specific plan called ‘an Implementation Plan’, which defines concrete actions and measures. For example, an adaptation plan can suggest using elements of green infrastructure to mitigate the heat island effect while the implementation plan could propose specific projects such as the revitalisation of a park or creation of a green roof.

Many cities in the ACT on NBS city network have recently developed their own implementation plans: Prague (2018), Warsaw (2019), Milan (2019) and Turin (2019).
The city of Vejle has developed its adaptation plan after reflection on the EU Policies (EU Directives) and as a response to the local challenges such as flooding. In the city, 14 designated areas are under the risk of flooding. Under its 2005 environmental scheme and SmartNatura the city restored over 100 hectares of its former agricultural and pastureland into a large urban wetland. The wetland is accessible to the local communities and can be used for recreational and sport activities. It is also a haven for many fauna and flora species.

Other cities, such as the municipality of Strovolos, Lakatamia and Nicosia, are currently developing their adaptation plans.

Local Policies

In recent years, sustainable urban planning disciplines are increasingly looking at new opportunities for ecosystem-based planning and nature-based solutions and have started integrating such concepts into traditional planning instruments, tools and local policies.

European cities are following very diverse paths for greening their local policies and tools: some developed their own green infrastructures and biodiversity strategies, others are including minimum legal requirement and standards for greening and renaturing districts and buildings within their Master plan, building codes, etc. Most of the EU cities included greening as one of the most effective solutions in their climate adaptation and mitigation plans.

Nevertheless, the situation is very fragmented and a deeper look at the local level would be needed to improve green areas minimum requirements and better integrate them within urban plans.

For example, in the city of Utrecht, there is a Green Structure Plan - a policy which incentivises the different stakeholders to plan and invest in NBS projects. It is an action plan (2017-2030) which aims for sustainable urbanisation whilst taking current and future risks and challenges into account. It explicitly states the importance of green spaces in the city to provide specific ecosystem services such as purification of air, retention and provision of clean water. It stresses the importance of citizens’ health and wellbeing, which is a cross-cutting topic for the city and of high importance. Utrecht believes that health (both mental and physical) can be effectively addressed by NBS.

The city of Barcelona included in the local climate plan the objective of raising 1m² of green area per inhabitant by 2030 and developed a whole green infrastructure and biodiversity strategy to support this objective.

Milan is doing quite a lot in terms of local planning and NBS. The building code already includes some standards to increase green roofs, but the Air and Climate Plan will propose a new and improved set of rules to manage NBS on both buildings and public spaces. Also, the Urban forestation plan provides the metropolitan city with an operational plan to plant thousands of trees in the coming years. The city authority launched the forestation plan in May 2018, in alliance with the process to revise the PGT - Piano di Governo del Territorio, the land use plan for the city of Milan. The PGT revision phase allows for the introduction of proposals on forestation and

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8 The objectives of Smart Natura is to identify cost-effective methods to reach the goals of Natura 2000 plans. Under the Smart Natura, the Danish municipalities are preparing action plans that will affect the agriculture land for the benefit of nature.

9 More information can be found here.
sustainability, resilience and energy issues within the general plan. In order to reach these objectives a new park on a metropolitan scale has been proposed, going from Parco Sud in the south and Parco Nord in the northern part of the city. To achieve this long-term governance objective a protocol was signed between the following partners: Milan Municipality, Milan Metropolitan Authority, Parco Agricolo Sud Milano (South Agricultural Park) Parco Nord Milano (North Park), Politecnico di Milano and Regional Authority for agriculture and forest services (ERSAF). Also, the new city Master Plan acknowledges the need for new ecological standards, given the increase in NBS.

The city of Genoa is coordinating the Climate Adaptation thematic partnership within the Urban Agenda for EU. Through working group activities, the partnership developed an Action Plan (final version approved in November 2018) where every action selected for implementation in urban areas is to be assessed in an adaptation policy cycle. The Action Plan consists of four main phases (assessing risk and vulnerability to climate change; select and planning adaptation actions, implementing adaptation actions; monitoring and evaluation) and has been downcaled to the city level by partnership members. In Genoa, the AP resulted in the setting up of a Resilience Office within the Municipality (September 2018) and in the “Genova Resiliente” strategy, developed through a participatory process (over 300 participants attended the meetings in November 2018) to promote the sustainable and innovative development of the territory. The “Genova Resiliente” strategy actions focus around three main pillars: Grey (innovative development of Infrastructure, network, communication and facilities), Green (climate change mitigation and adaptation, urban regeneration through innovative NBS and green infrastructure) and Soft (actions for the community, societal challenge and empowering economic framework).

**Inventory of Greenery**

The development of an Inventory of Greenery can be seen as a key step that every city should take provided it is serious about its environmental quality, biodiversity and resilience. It maps all the green urban spaces in the city’s jurisdiction as well as their location and size and provides information about the quality and functionality. It looks at utility values of green spaces and potential future use. Such an inventory is important for two reasons. First, it gives an overview of the greenery’s size and distribution and second, after identifying environmental and social challenges, the inventory can be used as a planning resource. For example, a city might suffer from an extreme heat in specific areas. The inventory map can be consulted to see what options there are when it comes to NBS planning and design to tackle such challenge.

In the case of Slovakia, for example, it is important to cite its Nature and Landscape Protection Act (n. 543/2002, paragraph 69) which requires municipalities to develop and adopt a strategy for a Local System of Ecological Stability as well as a strategy to deal with the management of trees.

There are interesting examples of inventories of existing green areas and elements of green infrastructure (e.g. trees) using GIS (Geographic Information System) data. Based on these data a territorial localisation of green elements can be developed. Such inventories of trees and other forms of greenery are an essential source for future planning and implementation of NBS. For example, they can be combined with heat maps and show
how the distribution of the greenery and heat intensive areas overlap.

The city of Basel in Switzerland developed an online tool (Baumkataster) for the local citizens and other interested stakeholders to track and monitor the city’s trees. Each tree has been assigned with a unique number. Information such as tree type, age, date of planting and protection status are provided.

Bratislava Karlova Ves is also using GIS data to map the green elements in its jurisdiction in order to plan green infrastructure more effectively.

The city of Warsaw also reports having such a system in place.

In 2012, the city of Genoa approved a green areas regulation (Regolamento comunale del Verde) which outlines the indicators for development, protection and management of green areas and trees (e.g. pruning, abatement, planting layout, choice of species). This regulation objective is to enhance the city’s natural capital by providing the guidelines for the planning of green public spaces, enhancement of urban biodiversity and enrichment of local flora. It provides rules for:

- Trees, shrubs and hedges;
- Public and private parks and gardens;
- Valuable and protected trees;
- Areas of environmental value, such as wooded areas hedges, protection spots and natural meadows rich on biodiversity;
- Rivers/stream banks

In 2015, the Urban Plan (PUC) also came into effect, placing a particular emphasis on environmental sustainability and considering a specific set of rules in order to protect the city from flooding and hydrogeological risk. Article 14 of the Plan’s General Regulation considers the following topics:

1. Safeguard from flooding and hydrogeological risk;
2. Buildings’ energy efficiency;
3. Permeability and water efficiency;
4. Soil safeguard and security;
5. Hydrographic network;
Financing and Tools

Financing

As for any project, securing sufficient financial resources is a key enabler. As far as NBS projects are concerned, it is often difficult to get the financial backing. Firstly, municipal administrations are responsible for many topics such as transport, mobility, environment, health and construction which compete against each other. Secondly, NBS do not fit into the classic business case because they must address several challenges such as existing data on NBS performance compared to conventional solutions, risk analysis and environmental and socio-economic benefits that are provided. A key consideration is the commercial return on investment. Municipalities often lack such data and analyses that could prove the value of NBS (Coles, 2019).

Identification of an economic value of NBS to make a compelling business case for investment is one of the key barriers. Typically, NBS are framed as green public spaces or urban parks and cannot compare themselves to other assets such as roads or tramlines that can provide direct monetary benefits. Therefore, a major challenge for securing long-term investment into NBS is the unrecognised cross-sector value which contributes to weak investment mechanisms (CABE, 2006).

In general, NBS are financed through traditional local authority funding. Since green spaces are mostly managed by local authorities, they are financed from the authority’s general revenue budgets. This budget is usually financed from taxation or government transfers. There are other options for financing which municipalities can tap into such as multi-agency public sector funding, taxation initiatives (e.g. value capture taxes), bond and commercial finance, income-generating opportunities, endowment or voluntary sector involvement, carbon finance (CABE, 2006; OECD, 2012). Figure 9 shows opportunities for financing climate change adaptation in municipalities, and the interplay between the various stakeholders involved and Figure 10 is a typology of sources of financing available for NBS implementation.

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10 Value (e.g. including environmental footprint and future impact) of conventional infrastructure is not taken so much into account when comparing to NBS. In other words, NBS has to prove itself to the conventional infrastructure and other traditional assets while conventional infrastructure does not have to prove itself at all, hence it is not an equal equation.
Figure 9 Opportunities for financing climate change adaptation in municipalities, and the interplay between the various stakeholders involved (adapted from EEA, 2017, p. 8).

Figure 10 Typology of sources of financing available for NBS implementation (adapted from Somarakis, 2019, p. 21).
The majority of the municipalities tap into municipal budgets to finance NBS. For examples, the city of Vejle’s Kongens Kær has been financed entirely by the municipality, which levies the funds through taxation. Some of the cities report leveraging private finance to realise NBS projects such as London and Utrecht.

The most common approach for financing small or medium size projects is through participatory budgets. “Participatory budgeting is a form of citizen participation in which citizens are involved in the process of deciding how public money is spent. Local people are often given a role in the scrutiny and monitoring of the process following the allocation of budgets. Costs of participatory budgeting can vary anywhere between £400 and £40,000 depending on the size and the scope of the project” (Local.gov.uk).

The city of Warsaw reports using participatory budgets as an effective way to involve citizens in planning and decision-making processes. These projects are focused on air and/or climate needs and are approved by the Air and Climate Department. In 2019, 2300 citizens’ proposals were implemented with a budget of 20 million Euros spent in the same year.

In case of Bologna, the mayor and city board decide on the annual participatory budget which is usually around 200 000 € per district. The process is the following: the citizens’ association and individual citizens come up with different project ideas that will be developed in a participatory approach within the so-called neighbourhood labs. Then there is a feasibility study done by the city to see whether the projects are realistic and feasible. At the end, citizens choose 5-6 projects that will be realised, one per district, through an open public voting system. Many projects funded under the participatory budget aim at enhancing green spaces in the city.

**Cost of NBS**

Price of NBS (greenery, water elements, some grey/artificial elements) depend significantly on aspects such as the following ones:

- **Type of NBS** – Is it a tree, shrub, flowers or a constructed wetland, green roof?
- **Age of greenery** – is it a seedling or a 15-year-old tree?
- **Components & Installation** – how expensive is the installation and what components does the NBS contain? (e.g. to support a greenery an artificial support system might be needed so is a green roof).
- **Maintenance** – how expensive is the maintenance (e.g. watering, health checks of vegetation by professionals)?
- **Location** – is the NBS going to be implemented in a street, sidewalk, existing city park or in an agricultural area distant from a city centre?
- **Land ownership** – if the land is owned by a private entity municipality might need to compensate it.

Regarding the cost of a single tree, which is the most common element of urban NBS, this can vary depending on the above aspects.

For example, the city of Prague has launched a new tree programme to plant a million trees in the next 8 years. The city is currently preparing an action plan for the programme implementation. In terms of costs, according to Prague, it is very hard to say how much it will cost because the costs could vary significantly. The number of planted trees will depend on how many of them will come right in the streets. While planting seedlings will only cost a
few €, the planting of a solitary tree in the park is worth 10 to 15 thousand CZK (400 – 600 €) according to its type and size, and for a single specimen in the street alley the city will pay at least 30 thousand CZK (1200 €) (Aktualne.cz). To give a perspective, the budget of 68 million CZK (2.7 mil. €) was allocated to the revitalisation of Prague city parks in 2019.

The city of Milan reports that the cost of one tree can be estimated to range from 30 € for a tree planted in an already existing green space such as a city park, but up to 800 € in grey spaces/streets where the planting is more challenging from the technical point of view (removal of asphalt and creation of a planting hole for a tree). The maintenance costs are not included in this calculation.

The price of a single tree can range from a few euro to more than 1000 €.

The city of London is in the forefront of Green Infrastructure implementation and financing. The city has established two important entities to facilitate the future implementation:

1. **Green Infrastructure Taskforce** following the launch of London Infrastructure Plan 2050 to make sure Green Infrastructure is considered as an integral part of city’s development and supports other key domains such as public health, sustainable transport and mobility.

2. **Greener City Fund**\(^\text{11}\) to help to achieve the city’s environmental strategy by having sufficient financial resources at hand.

**Tools**

Another key enabler for NBS is planning and design tools for climate adaptation and resilience. In general, such tools can assess the impact of a variety of NBS interventions on the urban environment. For example, Deltares has developed the Adaptation Support Tool (AST). This tool can help to suggest adaptation interventions, situate them in the right urban areas and obtain an estimate of their effectiveness and costs (Deltares, 2019).

Tools can help practitioners to identify potential investments in NBS and areas of intervention in the city, because the data and information of NBS tools can provide examples of best practices, high-level technical specifications, estimated costs, different benefits of NBS and the identification of climate risks. Better understanding of the performance of different types of NBS in urban areas has the potential to change the development of conventional grey engineering solutions towards NBS/green infrastructure. In-depth analysis of existing tools on the market has been undertaken under the Work Package 3 and published in a separate report as part of ACT on NBS project.

\(^{11}\) Greener City Fund
Conclusions

Many EU cities are facing the same socio-economic and environmental challenges: there are common themes but sometimes the impact and consequences differ. Climate change, rural-urban dichotomy and environmental pollution are just some of the main issues that urban areas are currently dealing with.

Cities are constantly looking for innovative and sustainable solutions which put people at the centre, which factor in quality of life and wellbeing, and make urban settlements more resilient to future adverse changes.

This report has explored how Nature-Based Solutions (NBS) could address those challenges, presenting useful and concrete examples and recommendations of the NBS contribution so far.

These are the crucial milestones to enable and mainstream NBS in our cities: Involving the right stakeholders and the whole of civil society in designing and planning the solutions (co-creation), developing adequate planning, governance and regulatory mechanisms, finding innovative financing instruments and using adequate and useful tools.

Providing examples and practical experiences on NBS projects and implementation, integrating useful observations from cities’ interviews, would serve as an interesting and hopefully useful baseline for other cities to undertake the same path.

In order to see greater change, NBS needs more open-minded people such as city mayors, urban planners and sustainability professionals, for whom the urban environment is a number one priority.

There is already a lot of evidence demonstrating Nature-Based Solutions (NBS) as a key strategy for sustainable future. What we need to see now, more than ever, is more action.

Indeed, the ACT on NBS project aims at providing support and resources for capacity building workshops, webinars and technical assistance to a wide ecosystem of cities with the aim of greater dissemination of the NBS concept, which are destined to play a key role in the transition to more liveable and green cities.
References


Annex 1: Roadmap to enable NBS on the municipal level

1. Is my city facing any social, environmental or economic challenges?
   - Yes: Proceed to Step 2
   - No: Proceed to Step 4

2. Is it likely my city will experience such challenges in the future (e.g. climate change)?
   - Yes: Proceed to Step 3
   - No: Proceed to Step 4

3. Would I be interested to create a green, sustainable and resilient city with happy and healthy citizens?
   - Yes: Proceed to Step 4
   - No: Proceed to Step 4

4. Create a list of city challenges

   - Could any of these challenges be addressed by Nature Based Solutions?
     - Yes: Proceed to Step 4
     - No: Proceed to Step 4

   - Consider Implementing Nature-Based Solutions
     - NBS might not be appropriate for your city now, but may be considered in the future if conditions change

TURN TO CHECKLIST OF NBS ENABLERS
Check list for NBS enablers

Adaptation Plan

- Does my city have an adaptation plan?
  Advice: Consider evaluating different challenges that your city is experiencing or might experience in the future and develop an adaptation plan. Then, consider addressing the challenges with appropriate NBS and specific measures which could be taken.

Inventory of Greenery

- Would it be feasible to develop an inventory of greenery in my city?
  Advice: Mapping of NBS elements (e.g. trees, shrubs, parks, green roofs) will give essential information about the actual situation as well as future opportunities. It can also help to compare different cities and trigger action.

Land Area

- Is there a sufficient land area in the city to allow for NBS?
  Advice: Many forms for NBS require a certain amount of available land for successful implementation. If land area is limited consider space efficient versions of NBS, such as so-called 'hybrid grey-green' solutions.

Human Resources

- Can I assemble a multi-disciplinary team with relevant NBS experience and expertise?
  Advice: Consider hiring new people with the relevant expertise or partnering with non-profit organisations, universities or consultants to support your in-house knowledge.

Task Force

- Can I initiate an establishment of a taskforce for the topic of NBS on a national or inter-city level?
  Advice: Consider establishing a taskforce of experts who would meet regularly to discuss the application of NBS. Such a taskforce can be formed on a national level (collaboration of municipalities, ministries), or on a city level if the city is big enough (representatives from different suburbs).

Working Group

- Can I initiate an establishment of a working group for the topic of NBS?
  Advice: Consider establishing a working group at the municipal level. It can consist of experts working at different departments (water, public health, air, construction and mobility). It is worth inviting key municipal stakeholders: water utility companies, universities, research institutes, arborists, farmers, banks, insurance companies, philanthropists, start-ups and entrepreneurs).
Financial Resources

- Do I have sufficient financial resources in place to finance NBS?
  Advice: Consider creating a special fund for financing NBS/Green infrastructure in your city.

Participatory Budget

- Can I implement participatory budgeting in the city?
  Advice: Consider using participatory budgeting for city projects so that citizens may be included in planning, design and decision-making processes of public green spaces.

Setting up environmental strategy and targets

- Has my city set up sustainability objectives and related targets?
  Advice: Consider setting up such strategy and targets to reflect on international and national sustainability policies and goals as well as the aspirations of your city. You can consider targets for CO2 emissions reduction, water & air quality improvement, mitigation of flooding or an amount (in m²) of green space required per person to provide for social amenity and recreation.

Monitoring of NBS performance

- Is it feasible for the city to establish a monitoring system to measure a basic set of Key Performance Indicators (KPIs) of NBS performance?
  Advice: Consider engaging with a university, research institute or an NGO that can help you to set up such system. Measuring KPIs can provide a strong scientific evidence to convince other stakeholders to pursue and invest in NBS.

Emotional Maps

- Can I apply tools such as emotional maps to engage with citizens?
  Advice: Consider partnering with cities that have already applied such tools. Emotional maps are not hard to implement and can help to build trust and relationship between a city and its citizens.

Planning and Design Tools for NBS

- Can I apply planning and design tools for NBS?
  Advice: Planning and design tools for NBS can help to identify appropriate adaptation solutions, situate them in the right urban areas and obtain an estimate of their effectiveness and costs. Such tools can be very helpful in convincing other stakeholders and decision-makers about the importance of NBS.
Annex 2: Dissemination Plan

WP2 is designed to both consolidate city specific learning about Nature-Based Solutions (NBS) and effectively disseminate the project information to the project city network and beyond in order to support cities in developing NBS city strategies.

Targeted Audience

The ACT on NBS project intends to reach two main target groups through the diffusion of knowledge and capacity building content produced by its activities.

The first targeted group are direct beneficiaries, which include:
- Municipal Governments (Urban/Environmental planners, Sustainability professionals);
- Technical Agencies (drivers of innovation at local, regional and national level).

The second target group, indirect beneficiaries, will include:
- Project developers: private utilities (water utility companies), construction companies, architects, landscape architects;
- Academia & Research Institutes: relevant universities, research institutes focusing on the topic of climate change adaptation and mitigation and the sustainable development agenda;
- Financial institutions: commercial/investment banks, philanthropists, social/environmental funds.

Table 1 Capacity building & dissemination activities planned under the WP2:

<table>
<thead>
<tr>
<th>Dissemination activities WP2</th>
<th>Brief description</th>
<th>Year</th>
<th>Target audience</th>
<th>Topic</th>
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<tbody>
<tr>
<td>Workshop 1</td>
<td>Upscaling peer-to-peer knowledge exchange</td>
<td>2020</td>
<td>Municipalities &amp; other relevant stakeholders</td>
<td>Enablers for NBS</td>
</tr>
<tr>
<td>Workshop 2</td>
<td>Upscaling peer-to-peer knowledge exchange</td>
<td>2021</td>
<td>Municipalities &amp; other relevant stakeholders</td>
<td>Enablers for NBS</td>
</tr>
<tr>
<td>Series of Thematic Webinars</td>
<td>Dissemination of learning from each WP to wider stakeholder network</td>
<td>2020</td>
<td>Municipalities &amp; wider network of relevant stakeholders</td>
<td>Enablers for NBS</td>
</tr>
<tr>
<td>Technical Assistance /</td>
<td>Delivered on a regular basis to</td>
<td>2019 - 2021</td>
<td>Municipalities</td>
<td>Enablers for NBS</td>
</tr>
</tbody>
</table>
Workshops

A workshop is a great format to expose lessons learnt and build capacities needed to mainstream NBS. It also provides a direct way to establish new partnerships and collaborations across the project stakeholders and cities.

While the initial in-person workshops in Amsterdam and Madrid, and numerous remote meetings for ‘ACT on NBS’, have been successful in bringing the ACT on NBS community together the time constraint has made it difficult to have ‘deep dive’ discussions with a range of practitioners participating and set clear targets with cities when it comes to adapting to climate change.

Two brainstorming workshops are planned, one in 2020 and one in 2021. The objective of these workshops will be in-depth discussion on the best practices of NBS implementation. The ACT on NBS project is expected to engage in the second year, 2020, beyond the initial consortium members to include multilateral agencies (many of which the members are already working with on other initiatives), pan-European cities with the possibility through ACT on NBS’s innovative design to expand and revise work packages, particularly as we build a knowledge-sharing platform for NBS that is meant to interface with existing resources. The two workshops will provide us with an opportunity to engage with the community, facilitate learning and upscale the implementation of NBS.

ACT on NBS has already started an organisation process and submitted an application to hold the first workshop in Bellagio (The Rockefeller Foundation Bellagio Center) in Italy which would provide the projects with a unique opportunity to ‘catapult’ this activity by bringing together world-leaders who are operating outside of ‘ACT on NBS’. By bringing together key stakeholders from within and beyond the EIT-Climate KIC and ACT on NBS community, this ‘innovation ecosystem’ can be developed to build on existing initiatives to upscale peer-to-peer knowledge exchange and, critically, the implementation of NBS within cities. The application will be evaluated in February 2020.

The second option would be to hold the workshops in one of the project cities. More advanced cities in NBS research and implementation would be favoured in order to organise field trips to demonstrate NBS projects in practice.
Webinars

Webinars are live, web-based video conferences where a group of hosts speak to an audience, with an interactive Q&A session usually at the end. Webinars can be attended by hundreds of people and therefore can have a significant impact. Another advantage is that webinars can be recorded and uploaded to the project website and used as an educational resource. The people who were unable to attend these webinars live can do so at any time.

WP2 will host 3-4 thematic webinars in 2020:

- A project introductory webinar introducing the conceptual framework and the project (developed under WP1);
- Thematic webinars steered by cities to explore and discuss the applicability of NBS approach in different contexts, diverse climatic environments and spatial setting.

Both project cities and potential ‚replication’ cities will be invited to participate and to receive real-time advice and support. Other stakeholder groups such as civil society, architects and policy makers will be invited, as well as companies which could benefit from implementing NBS. Participants will also discuss the application of specific tools and approaches and their future visions for resilient and adapted cities through NBS. Webinars will be promoted through the project website, social media and partner network to maximize participation and involvement of interested organisations and individuals.

Two to three speakers are expected to take part in each webinar with a subsequent Q&A session at the end. The aim is to attract between 20 external cities to participate in each webinar as well as number of other relevant stakeholders. All webinars will be recorded and uploaded to the project platform serving as a knowledge resource, training material and engagement tool.

Technical Assistance / Mentoring

Designed for supporting municipalities in implementation of NBS in all stages, especially in cases when there are insufficient resources or experience to build capacities in-house. Mentoring is especially helpful for cities with little or no experience with NBS.

WP2 will provide technical assistance / mentoring to the city network either remotely or on the spot. Municipalities receiving the assistance will be selected through a transparent online procedure (interested municipalities will respond to an open call that will be published on the project’s website and adequately promoted). For example, on 5-6 December 2019 the project ACT on NBS, with the support of WP2, provided technical assistance in Cyprus. The municipalities of Nicosia, Strovolos and Lakatamia, the Cyprus Energy Agency (co-organisers) and the Cyprus Ministry of Environment were consulted on the issue of pluvial & fluvial flooding in relation to the management of the Pedieos River. The following challenge drivers were identified:

- Densification of the urban environment;
- Destruction of natural floodplains;
- Climate change (intense flash floods occurring more often);
- Insufficient management of the riverbed (vegetation and waste);
- Upstream agricultural practices (lack of natural ecosystems that would allow the excess rainwater to be kept and released gradually to the riverbed).
The municipalities and the ministry of Environment, with the support of the project, formulated potential solutions such as:

- Rehabilitation of the floodplains to accommodate more water;
- Redevelopment and widening of the riverbed;
- Supporting the riverbanks with vegetation to prevent erosion and enhance the retention capacity (*Platanus Orientalis*, *White Willow*, *Reedbeds*);
- Provision of better management of the riverbed to clear dead organic matter and waste.

The WP2 also promoted the ACT on NBS project in a Slovak National Conference titled *Green Infrastructure and Biodiversity in Cities and beyond* that took place in Bratislava in October 2019. The participation helped to engage with new cities and ministries that work with the NBS concept.

**Internal Communication**

There is already an established internal communication channel through SLACK which is used by the project consortium members as well as the city network. On a regular basis the consortium holds monthly calls to track the progress of the project and each individual Work Package, facilitate the exchange of the knowledge among the Work Packages and discuss new opportunities for the dissemination and promotion of the project.