

### Guideline for developing & implementing action plans in cities or urban areas based on application of UEA (Urban Environmental Acupuncture)

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**GUIDELINE FOR DEVELOPING  
& IMPLEMENTING ACTION PLANS  
IN CITIES OR URBAN AREAS  
BASED ON APPLICATION OF UEA  
(URBAN ENVIRONMENTAL ACUPUNCTURE)**

# GUIDELINE FOR DEVELOPING & IMPLEMENTING ACTION PLANS IN CITIES OR URBAN AREAS BASED ON APPLICATION OF UEA (URBAN ENVIRONMENTAL ACUPUNCTURE)

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## Imprint

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## Scientific Report



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## What is the purpose of the guideline?

It is our intention in this manual to speak to both scientists and practitioners such as planners, architects or individuals from different offices in cities and municipalities (e.g. gardening offices, planning offices, environmental offices) that are looking to implement small scale green space in urban areas.

Practitioners and research scientists are both likely aware of the increased interest and importance placed on further development of greenspace within dense urban areas. As greenspaces address many of the problems urban areas are facing (e.g. climate change impacts, mental health concerns, space for recreation, biodiversity issues). With the pressure of increasing urban greenspace comes the question of how can we implement small scale greenspace in dense urban areas?

Urban environmental acupuncture (UEA) addresses this question and offers a tool to guide small scale implementation of green infrastructure. It addresses both the technical (i.e. which nature based solutions and where) and social aspects (i.e. who to involve and how) in green infrastructure implementation. The theory behind UEA emphasizes increasing the function of cities through pin-like interventions in problematic urban spaces as a way improving the overall city. The innovative contribution of urban acupuncture is that through many small interventions the overall city organism can be improved. UEA of course is focused specifically on increasing green infrastructure which may contribute to and/or bridge existing green infrastructure networks. As experienced within our SALUTE4CE project work, action planning for UEA does not replace other forms of planning but accompanies it. It is a concept which guides and contributes to other forms of planning.

This guideline provides an overview on the development and implementation of action plans for integrated environmental management in cities specifically the application of Urban Environmental Acupuncture (UEA). We have developed an approach highlighting urban green infrastructure with a special focus on small green sites of 0.2 hectares or less. Included in this guide are suggestions concerning content, process of action planning, including required data as well as recommendations for public involvement. Suggestions are based on experience gained during implementation of pilot projects in Central European cities (Poland, Germany, Italy, Slovakia). This guideline on developing and implementing action plans for integrated environmental management in cities is rooted in the Interreg Central Europe project SALUTE4CE, performed by 10 European partners from 2019 to 2022.

### Action planning and its usage in implementation of Urban Environmental Acupuncture (UEA)

The simultaneous implementation of many small green sites can be a challenge to coordinate. This guideline will help to address and lessen this challenge by introducing the tools and lessons learned within the SALUTE4CE project. We have created 4 action plans in 4 European cities and city regions to implement UEA. Action plans have played a decisive role in SALUTE4CE project and can also play a decisive role in future UEA implementation (i.e. outlining future goals and aims, planning of maintenance and monitoring actions). Action plans have provided in our case a framework for the implementation of measures needed to create small green sites, through provision of many ecosystem services (ESS) for the benefit of urban inhabitants. Based on these action plans 16 pilot projects were implemented transnationally which provide an excellent basis to learn from. This guideline can be understood as a model for administrations, planners, citizens, etcetera looking to implement UEA outside of the SALUTE4CE project.

We see action planning as having two important roles. On the one hand, action planning is understood as a communicative process of involving a variety of stakeholders to discuss, agree on and implement common goals (cp. Selle 1997, Healey 2020). Additional to the communicative function, action planning has also an important strategic task: To bring together concrete measures including responsibilities, financing, and scheduling. For this a written document is needed that describes how a specific set of actions are to take





place to bring certain goals and/or visions to fruition. An action planning process contains different elements which typically occur in chronological order (Fig. 1) but should also allow for repetition corrections as well as expansion during the process. In this sense an action plan is a flexible, non-statutory, a non-binding plan, based on the agreements of engaged actors (Note: additional documents such as letters of commitment can be used to strengthen agreements). There are various definitions of action plans, however the most suitable definition used also in the SALUTE4CE project originates from Coyle (2011); an expert in developing sustainable and resilient communities:

*“It [an action plan] should be used to identify the specific tasks, timelines, and resources necessary for implementation. It will activate the community’s vision by enabling the desired outcomes appropriate to the people and place, including the protection of natural landscapes.”*

#### City of Vancouver, Canada (2017)

A plan called the “Greenest City 2020 Action Plan” has been developed as a roadmap to becoming the greenest city in the world by 2020. The plan is well organized and includes 10 goal areas (i.e. different types of goals to be reached) with measurable targets and deadlines (i.e. specific tasks). The goal area “access to nature” includes specific targets, such as: all residents live within a five minute walk of a park, green way or other green space, plant trees and restore/enhance natural areas. Specific resources have been identified in the plan to support these measures (i.e. city stakeholders, students, businesses and institutional partners). A logical well-organized break down of goals, targets to be reached as well as resources necessary are identified increasing the probability that the community’s vision becomes a reality.



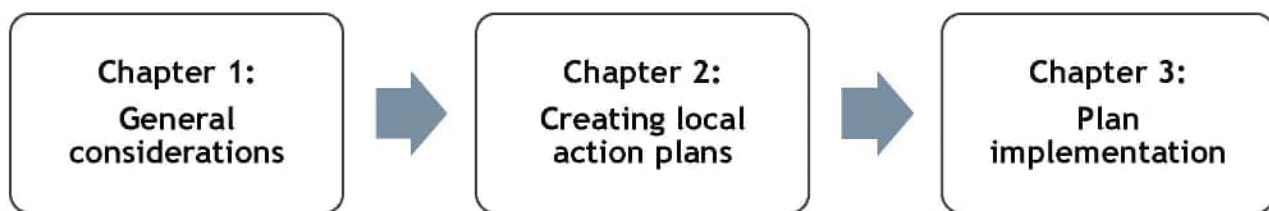
**Vision → Goal areas → Targets (with deadlines) → Identification of resources to support implementation → Implementation**

Fig. 1: Action Plan Example City of Vancouver, Canada (Source: Office of Neighbourhoods, City of Vancouver 2017)



## How to structure an action plan?

Action planning is a complex process involving not only the respective administrative units of a city but also a wider range of actors such as, residents, non-profits, and specific social groups like youth, families and elderly with their specific perceptions, preferences and needs and wants concerning urban greenery. This became clear when conducting action planning within pilot project countries as part of the SALUTE4CE project. Our recommendations include some general considerations on action planning in cities, the process of creating local action plans and ideas about plan implementation. To increase understanding and to provide a quick reference of the concept we start with a concise explanation of the 3 main parts.



### General considerations before starting the planning process (Chapter 1)

Before you begin the action planning process you should clarify some basic questions together with the community. Based on our experience with the SALUTE4CE project these questions may entail:

- ✓ What is the vision of urban green in your city for 2050?
- ✓ What are the main challenges your city is facing related to urban green and blue infrastructure (GBI)?
- ✓ Considering this, how can an action plan focusing on micro-greenspace implementation (UEA) contribute to solve these problems?
- ✓ How can implementation of UEA contribute or how does it relate to already existing plans and concepts of the city or region?
- ✓ How will you define UEA and how can it be used to motivate interest and to involve companies, citizens, and social groups in green infrastructure planning?

Having achieved a basic understanding of these questions, this could be collected in a preliminary statement on action planning for UEA in your city. The purpose of the action plan should be explained, including, what urban acupuncture is and how it shall be used. Moreover, the advantages and potentials of the concept in relation to the challenges of your city should be highlighted, for instance, the low budget and fast implementation character, as well as the opportunities of citizen and stakeholder involvement. While drafting the statement and action plan purpose please keep in mind that an action plan must be customized to meet the needs and purposes of your city. This can be accomplished by including the public even before the planning process has begun (e.g. press releases, calls to participation, public outreach activities).

### Creating local action plans (Chapter 2)

Chapter 2 includes the bulk of the conceptual considerations created as part of the action planning process. The challenges and/or problem areas (i.e. acupuncture sites) that need to be addressed are identified as well as appropriate interventions (i.e. pinpricks). Moreover, all steps of action plan creation include specific participation forms which are introduced subsequently. A detailed excursion on this issue is available in chapter 5.



The process of creating a local action plan includes three steps.

- The first step is preparation (preliminary activities):

In this step an action planning team is formed. Several tasks need to be completed such as formulation of planning goals based on the preliminary statement on the urban green vision. Gaining public, political, and financial support is important in this early stage of planning. A concrete work plan that serves as a guide throughout the planning process is recommended. This could be accomplished in the form of a work program including a timetable and a set of milestones. Units of the city administration related to urban green are to be contacted. Finally, it is the moment to inform the broader public about the initiative and create concrete opportunities for public participation and input.

- The second step is data analyses (gather and evaluate information):

In this step data collection is the main task. Relevant documents include but are not limited to physical conditions (i.e. current state of and character of GBI), demographic conditions, economic and financial circumstances as well as the planning framework. The latter includes a review of other strategic and comprehensive plans of the city (in details see chapter 5). Data and documents are analysed and used to better understand the frame conditions relating to the local situation. The functional connections between cities and their hinterlands, such as green belts and green corridors as well as general ecological, economic, and social situation, should be examined. If possible, additional data can be collected via surveys or other methods distribution or external organizations. This is a good opportunity to involve the public, for instance via public hearings. Inhabitants and housing companies are often well informed about urban green shortages and potentials. This could be connected with a public competition for the best ideas (e.g. location, types of Green Infrastructure, name of a park). Based on this, a profile of your city should be written, including all characteristic features around urban green. Finally, a (preliminary) list of UEA sites is compiled here.

- The third step is plan development (formation of action plan):

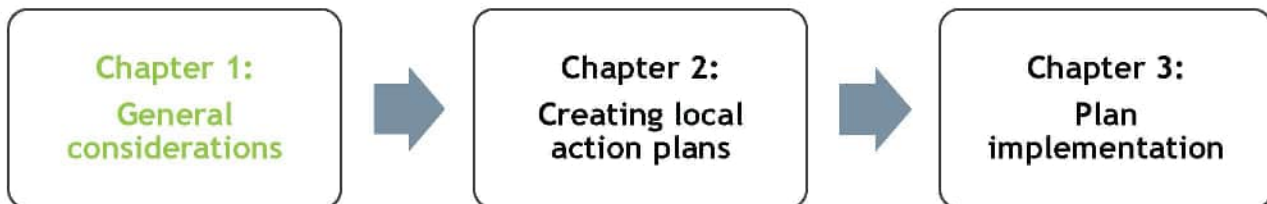
The final selection of the UEA sites as well as of the preferred green solutions - we call them nature-based solutions (NbS) takes place in this step. Using a list of criteria (see chapter 5) plan measures including specific goal areas and targets (NbS) are identified. Examples of goal areas include, reducing the urban heat island effect, improving resident well-being, improving social cohesion, and enhancing biodiversity. Targets for the respective goal areas should include planting greenery (e.g., trees, bushes, climbing plants and grass) and pertinent outdoor equipment such as, benches, outdoor furniture, or play structures. Also here, public involvement is crucial to the planning process and can help improving the quality of results. The result of the final step is the local action plan. This should not be only an issue of the administration. The visibility of public measures in the field in green and blue infrastructure could be improved by a bigger public event in the city hall including awarding the best ideas of the public competition. When local TV, press and other media show interest, it offers the opportunity to improve public awareness of the need for Green Infrastructure (GI).

### Plan implementation (Chapter 3)

In chapter 3 a description of how the action plan will be implemented is provided. The defined targets and measures identified in the developmental stage will be undertaken. We recommend maintenance and management plans be created to ensure that pilot projects are maintained in the future. What is more, monitoring and evaluation of the implemented UEA sites can be conducted to measure the impact of UEA site creation. This is based on a set of indicators selected by the action planning team.



## Chapter 1 - General Considerations



### 1.1. Background and advantages of utilizing action planning to implement Urban Environmental Acupuncture in cities or urban areas

The main objective of the SALUTE4CE project was to protect and develop natural resources via integrated environmental management of green and blue infrastructure accomplished specifically by planting native and climate resistant vegetation within selected cities. As urban areas densify, and more individuals fill urban centres world-wide the challenge of maintaining a good quality of life gains importance. Especially when considering the impact of climate change on our cities. Undoubtedly there is a need to improve or maintain quality of life and manage the impacts of climate change world-wide. Thus, to extend the objectives beyond the SALUTE4CE project to better manage green and blue infrastructure is to address quality of life in urban centres globally, the impacts have the potential to be substantial.

Urban Environmental Acupuncture (UEA) has been employed as a method of protecting and developing natural resources. As understood here, UEA provides the opportunity of improving the urban fabric by increasing the availability and prevalence of green space. Green spaces may complement one another by bridging large and small sites and contributing to the urban green network. It is argued that many small interventions can improve access to ecosystem services in cities, providing an effect that goes beyond the perimeter of the area of intervention. Project partners from Germany, Poland, Italy, the Czech Republic, and Slovakia have implemented the UEA concept using pilot projects within four cities respectively city regions (Fig 2). Within each of the four participating countries, four pilot project (separate interventions) have been implemented. Altogether the project has resulted in the development of 16 pilot projects in so called “UEA sites”.



Fig. 2: SALUTE4CE pilot project locations (Source: J. Hemingway & S. Witschas, IOER, 2019)

The thinking behind urban acupuncture is that small-scale selective adjustments to cities can progressively transform the urban fabric resulting in significant positive impacts on a larger urban scale. Small urban spaces such as: inner courtyards, back-alley ways, abandoned plots, facades, roofs, and street verges can be transformed into greenspace thus contributing to the green infrastructure within urban areas. The implementation of small-scale urban acupuncture to increase green space has the potential to gradually heal the overall urban area (Apostolou 2015).

Urban acupuncture has been described as a type of medicine that can be applied to cities. Like traditional Chinese medicine, urban acupuncture is supposed to contribute to healthy responses within cities. This happens through physical interventions or the application of “pinpricks” (Fig 3). Not only should urban acupuncture affect the specific place being intervened, it should also improve the function of surrounding areas (Lerner 2003).

Cities have been viewed by some as a multidimensional organism or living environment containing sensitive flows within the built human environment. One has to be “in touch” with the living environment of the city in order to identify acupuncture sites and the “needle” to be identified in order to determine the appropriate physical reaction (Elkjær 2010). Due to its main objective, for the purposes of the SALUTE4CE project this approach is referred to as UEA. City planners and practitioners are often knowledgeable concerning the challenges that exist within their urban districts. This can be useful in identifying “acupuncture sites” or specific physical locations needing improvements and the “needles” or the actions needed to address urban problems



Fig. 3: Visual conceptualization of Urban Environmental Acupuncture “needle and pinprick sites” (Source: Franka Strangfeld, 2020)

(Hemingway, Mathey, and Wirth 2019). Additionally, within the SALUTE4CE project the knowledge of practitioners and planners has played a key role in implementing UEA. Local decision-makers and practitioners have identified underutilized areas within their cities in need of urban greening as well as the necessary nature-based solutions. Practitioners and planners are also able to lead such initiatives bringing the idea to their administrations and the public.

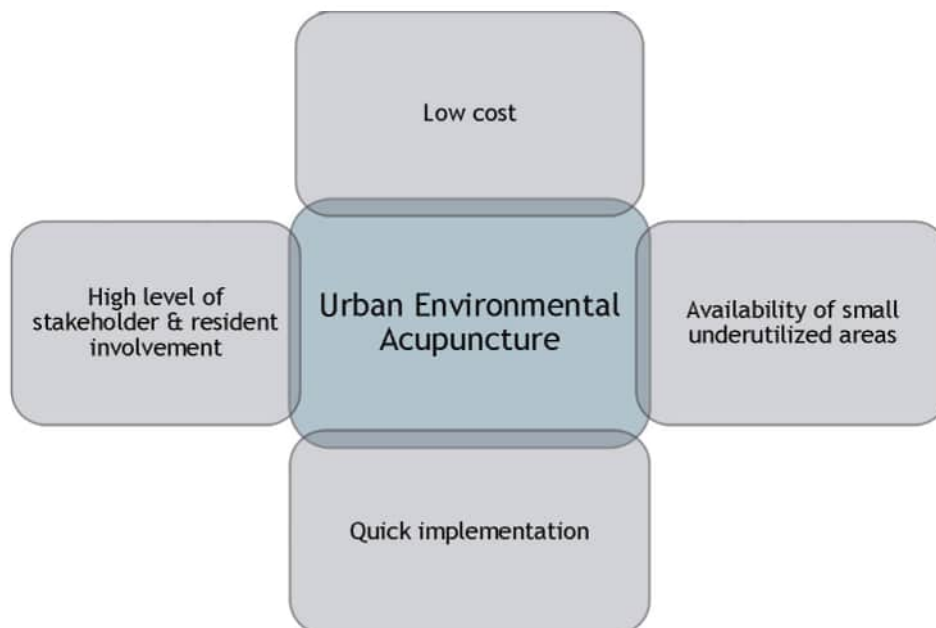


Fig. 4: Potential benefits of UEA (Source: Authors' Illustration)

At the onset of the SALUTE4CE project we identified advantages of utilizing UEA (Fig 4). Firstly, due to the small size of the sites the projects implemented should be lower cost. Secondly, we assume they are quicker to implement when compared to large urban greening projects. A third advantage we identified was being able to obtain micro-spaces more easily than large spaces especially within dense urban areas. Finally, the local nature and the small size of the sites lend themselves to a high level of stakeholder and resident involvement (i.e. located where residents live and work, oversee-able due to small size).

After pilot project implementation we still stand by these potential benefits however there are a few things to keep in mind. To maintain low-cost projects an effort should be made to do so. For example, in some of the pilot project countries playground equipment and benches were found to be especially expensive. Thus, if the project goal is to keep the measures implemented especially low cost, then a conscience effort should be taken to keep costs low. Could some of the work be accomplished by volunteers or could some of the equipment be donated?

When we think of quick implementation it should still be kept in mind that the planning processes tend to include the same procedures as larger projects unless some sort of streamlining exists for smaller projects. Thus, even if the time to construct the physical interventions is less than larger projects the same policy and filing procedures are likely to have often to be followed. Here it is important to keep the bigger picture in mind to avoid frustration, keep in mind and remind others how these micro-spaces are contributing to the green network as a whole and how users will benefit.



Within each of the four pilot project countries more potential sites for UEA were identified than selected for the pilot projects. This is a good indication that the availability of small sites is as we suggested. As a forewarning to those implementing and planning the implementation of UEA, keep in mind that some of the available sites may not be as aesthetically pleasing. Here we stress the importance of the initiative in improving the urban fabric even where the challenge may be great to do so.

Finally, considering the approachableness of UEA sites as they are small and local, engaging with stakeholders can still sometimes be a challenge.

## 1.2. How to get started on forming local action planning goals?

Just as was the case within the SALUTE4CE project, the implementation of UEA will be unique to each city or region it is being applied to. For each new project a description of the action planning goals is needed and the purpose of UEA in meeting these goals. This is a purely inspirational activity to be completed by key actors. We recommend a brainstorming early in the planning process, involving key persons in the city (Fig 5, Fig. 6). These persons do not need to be city officials. Often innovations in cities are inspired by actors from outside the administration, this may include environmental associations or Local Agenda groups. This type of activity could also be used to jump start the process of identifying planning goals within any city looking to implement UEA.

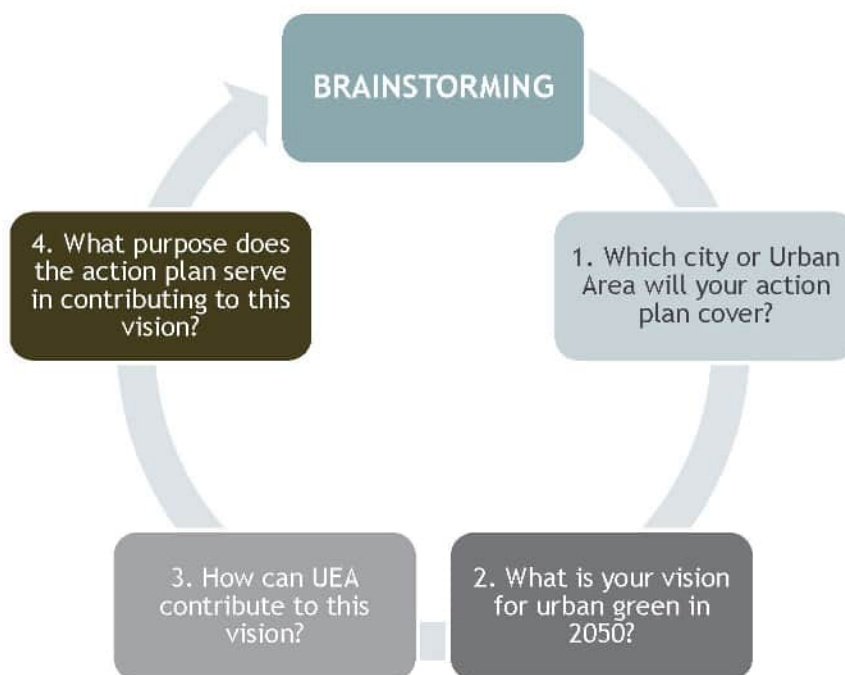


Fig. 5: Potential questions to jumpstart the brainstorming process in action planning for UEA (Chart: Author's, 2022)

Such a brainstorming could be grounded based on the following questions (Fig. 5)

1. Which city or urban area will your action plan cover?

This question is intended to narrow down and focus on the planning area where UEA will be implemented. Is the intention to start out small by focusing on one urban neighbourhood or district or will it be implemented throughout the city or city region? This exercise also helps to focus thinking and to address the urban challenges facing the target area. The responses to this exercise varied in SALUTE4CE project. Some project partners listed three cities as part of their city region, others just one city and some a city with its surrounding rural municipalities.

2. What is your vision for urban green in 2050?

After considering the spatial dimension of implementing UEA the time dimension should be considered. Here we suggest thinking about the vision for urban green in 2050 but this is flexible. If the time horizon of 2050 is too far in the future choose a year that fits the current planning circumstances within your jurisdiction. The goal is to think about the future and what it should look like in terms of green infrastructure. The purpose is to encourage thinking concerning what must be accomplished now to make the green infrastructure vision a reality later. Please note that urban transformation is a long-term task. Examples of visions from the SALUTE4CE project partners include “To adapt to climate change, include nature-based solutions in urban policy, to continue green infrastructure development”, “To boost the ecological approach integrated into public spaces and infrastructure”, “To have green areas as resources and possess self-sustainability of urban green areas”, “To reduce summer heat damage, increase heat resistant vegetation and increase public interest in green infrastructure”. The vision may have one focus or more as seen with the pilot project examples.



Fig. 6: Brainstorming activity with SALUTE4CE project team members in Erfurt, December 2019 (Photo: City of Erfurt)

3. How can UEA contribute to this vision?

It is important to link the vision for urban green with the contribution that UEA can make to that vision. What can UEA - in particular the upgrading of small urban green or small derelict plots - accomplish in this vision that would otherwise be more difficult or impossible? Our project partners identified UEA as important in integrating local communities in the planning process, providing a unique character to urban spaces at the same time as increasing urban green space, to experiment with low-cost environmental initiatives and provide education and finally to contribute to the green networks of cities.

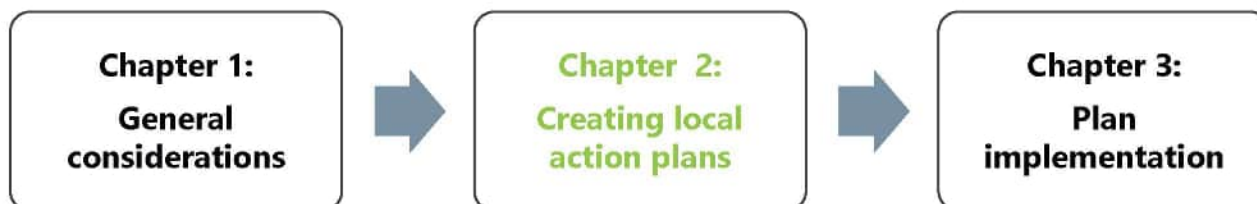




4. What purpose does the action plan serve in contributing to this vision?  
 Finally, the individuals initializing the planning process should consider how the action plan will contribute to the vision of green infrastructure in the future. This is done as an assurance that the action plan is useful to those that need it. The visions and ideas concerning UEA, and the purpose of the action plan are likely to further develop overtime as more individuals contribute to the process. At this point the answer to this question may remain general. In the next planning step (part 2), the targets and measures necessary to meet specific goals are explained.

## Chapter 2 - How to create a local action plan?

In chapter 2 of the guideline, we progress and present the process of creating local action plans for the relevant city or region where UEA will be implemented. Part 2 of the planning process is much more detailed and more comprehensive than part 1.



Tab. 1: Overview of action planning steps and results within cities implementing urban environmental acupuncture as well as options for participation in each step

| Chapter 2: Creating local action plans                            | Results   | Options for participation (see Chapter 4)   |
|---|---|---|
| Step 1: Planning preparations (preliminary activities)            | <ul style="list-style-type: none"> <li>Action planning team</li> <li>Working plan with assigned tasks, milestones, timetable</li> <li>Planning goals</li> <li>Defined planning area (Section 5.1)</li> <li>Public, political and financial support</li> </ul>   | <ul style="list-style-type: none"> <li>Informing the public (e.g. press release, calls for public participation/input)</li> <li>Invitations for further participation (newspapers, social media, etc.)</li> </ul>   |
| Step 2: Data collection and analyses (gather/analyse information) | <ul style="list-style-type: none"> <li>Assembly of required information</li> <li>Completed profile of the city</li> <li>List of potential UEA sites including site analyses (Section 5.2)</li> <li>Final list of measures</li> </ul>  | <ul style="list-style-type: none"> <li>Involvement in data collection</li> <li>Public hearings</li> <li>Public competition for ideas (e.g. identifying sites, solutions, naming parks)</li> </ul>   |
| Step 3: Plan Development (formation of action plan)               | <ul style="list-style-type: none"> <li>Nature based solutions for each small green site (Section 5.3)</li> <li>Action plan including:               <ul style="list-style-type: none"> <li>Final selection of UEA sites</li> <li>Selection of targets and measures (NbS)</li> <li>Recommendations for implementation</li> </ul> </li> </ul> | <ul style="list-style-type: none"> <li>Large public event including               <ul style="list-style-type: none"> <li>Presentation of the action plan</li> <li>Awarding the best ideas of the public competition</li> <li>Discussion of perspectives of urban greenery</li> <li>presentation in local TV, press and other media</li> </ul> </li> </ul> |



This chapter includes a review of the various elements the action plan should contain. During the action plan development process the challenges as well as problem areas (i.e. acupuncture sites) that need to be addressed will be identified as well as appropriate interventions (i.e. pinpricks). Table 1 provides an overview of the three action planning steps, their results as well as options for participation. As part of the SALUTE4CE project various tools were developed to guide decision-making regarding site and measures selection as well as implementation of UEA. For more information on all products and decision-making tools developed as part of the SALUTE4CE project see information in the green box below. In this guideline we provide guidance on including the public in decision-making, planning and implementation and living labs in chapter 4. Additionally, we provide guidance on identification of green deficit areas as well as selection of green UEA sites and NbS in chapter 5.

**\*Tip: To see all decision-making tools check out the SALUTE4CE webpage\***

- > Official SALUTE4CE Homepage:
  - <https://www.interreg-central.eu/Content.Node/SALUTE4CE.html>
- > For information on UEA site selection see: Deliverable D.T.1.1 called the Methodology of Spots Selection:
  - <https://www.interreg-central.eu/Content.Node/SALUTE4CE/SALUTE4CE-D.T1.1.1-VERSION-final-31.01.2020.pdf>
- > For information on UEA intervention types see: Deliverable D.T1.2.1 called Report on principles for selection of areas and interventions
  - <https://www.interreg-central.eu/Content.Node/SALUTE4CE/SALUTE4CE-D.T1.2.1-FINAL-202008110.pdf>

## 2.1. How to prepare an action plan? (Step 1)

Within the preparation step preliminary activities take place which set the groundwork for the planning activities to follow. Several activities should take place at this point such as deciding on responsible parties, setting concrete goals, identifying local stakeholders, considering potential challenges and opportunities in future planning and options to involve the broader public in the process.



Fig. 7: Action planning should take place with experts from relevant city departments (Photo © R. Vigh, IOER-Media)

### Who should be part of the action planning team?

Before beginning the process of creating an action plan, the action planning team needs to be selected (Fig. 7, Fig 8). An internal coordinator should be appointed; this is the person in charge of leading the creation and implementation of the plan. It is recommended to include three to five core action planning team members. Within this team a contact person for citizen and resident concerns should be chosen; this can be the coordinator or an additional individual. Other potential members of the action planning team include individuals from municipality departments (e.g. planning, environment, parks and gardens) as well as other relevant institutions or organizations that possess applicable expertise and interest in terms of green infrastructure (e.g. environmental organizations). The action planning team should consider whether an external moderator - outside of the core members (i.e. a neutral person who is not a formal member of the planning team or project) or someone from a planning office - should be involved. Such a moderator can help to reduce the workload of the coordinator. In addition to identifying individuals and assigning roles, the action planning team will be responsible for initiating the planning process, coordinating implementation and citizen involvement. It is important that the action planning team possess the skills, competency, and authority necessary to carry out tasks of the analysis and implementation steps. Considering the balance of skills within the core group is also important. It is useful to have individuals in the action planning team that are influential and valuable in the process of planning for the UEA sites. They should also be motivated and have the time to contribute to the process generously (GreenKeys Team et al. 2008).

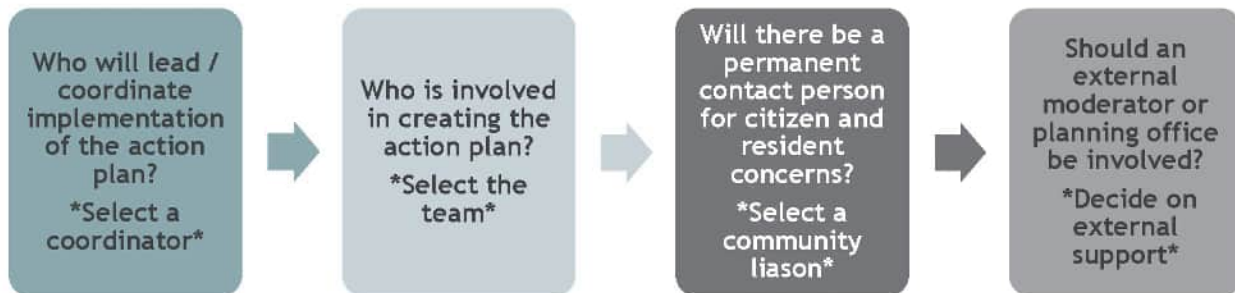


Fig. 8: Overview of questions to consider when forming an action planning team (Source: Author's Illustration)

### Defining planning procedures

The tasks of the action planning team also include defining responsibility, creating projects, organizing participation, public relations, collecting data and external expert outreach among others. It will be necessary to create a working plan with deadlines for the team to ensure that goals are met. Specifying who is responsible for which task and by when. Also important is identifying required formal (legal) procedures which need to be considered as part of the planning and implementation process (GreenKeys Team et al. 2008).

### Revisit visions and goals

The action planning team should revisit visions and goals discussed during the brainstorming step to see if they need to be adjusted or expanded. Our specific objective within the SALUTE4CE project was to improve environmental management of urban areas to make them more lively places. We addressed this by promoting for example, the planting of native and climate resistant vegetation to restore biodiversity and natural heritage. Your vision or goals may be based on this or based on city or regional goals. The visions and goals finalized here should be reflected within the action planning process. The potential impacts of implementing the action plan should be stated clearly. Potential impacts are not limited to but may include change of urban landscape, strengthening of stewardship of nature capital, change in governance and improvement of resilience within urban areas to climate change. Through your action planning activities, you will be improving capacity of the public sector and related entities to enhance integrated management of green and blue infrastructure within the respective city or urban area by creating UEA sites on abandoned or underutilized urban plots. The innovative transnational solutions created within the SALUTE4CE project have provided an integrated territorial and environmental approach through the utilization of novel concepts of UEA. Visions and goals can be modified and improved upon throughout the action planning process. Importance should be placed on input gained from residents and other stakeholders during living labs or other formats.

### How to gain support to implement UEA?

Just as the visions and goals of action planning will be different for each city. The action planning teams and other stakeholders supporting your efforts will also be unique. In this section some pointers are given to consider when seeking support to implement UEA from various sectors of society. Below is an example of the stakeholder collaborations which took place in Liptovský Mikuláš, Slovakia (Fig. 9). The action planning team consisted of members from a research institution, mayors, members of city parliament, a civil association, the public as well as additional scientific support from the SALUTE4CE project. Public



support included residents, interest groups especially students and additional experts from architecture. Public participation formats were diverse and included living labs, a GIS application used to collect data on potential UEA sites, various websites, the use of social media networks like Facebook, additional workshops, and e-mail correspondence. The public input influenced site selection, identification of problem areas and problems needing to be addressed and nature-based solutions selected (i.e. measures implemented).

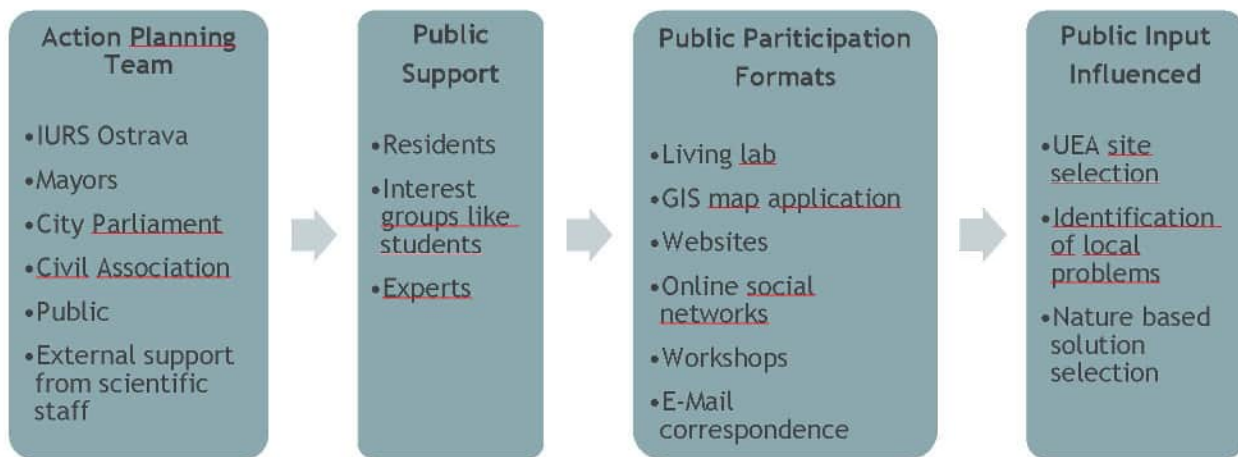


Fig. 9: Example of stakeholder collaborations implementing UEA from Liptovský Mikuláš/Slovakia (Source: Author's Illustration)

### Public support

Important to the success of any action plan is the cooperation of the planning experts with the public. The public may include residents, interest groups, relevant experts, and stakeholders (Fig. 9). This is particularly important where the community should be involved in planning, building, maintaining, or monitoring UEA sites. It is important to reach out to and involve the public and important stakeholders in the very beginning of the action planning process. A first step could be a press release to inform the public about content, goals, and participation opportunities of the action planning process. The public should be included throughout the planning process; and be kept up to date about the progress of planning, including the development of planning procedures. Additionally, the public can contribute to building visions by making the needs of the community known. By getting to know residents or the future potential users of the respective small green spot, one can gain knowledge concerning the local situation and the needs of various groups and their expectations (i.e., which ecosystem services are particularly needed). The public can participate in action planning of the UEA site in a variety of ways including both formal (e.g. planned events like living labs) and informal collaboration (discussions taking place while visiting the neighbourhoods or sites). Specifically, as part of the SALUTE4CE project, the public has been invited in some cities to participate in so called living labs, as well as other public events (Fig. 10), goal-oriented workshops, public relations campaigns, websites or social media channels.

**\*Tip: Examples of public events completed during the SALUTE4CE project\***

- > For inspiration on conducting public events such as local workshops, project meetings, seminars and how to keep the public informed of UEA investments visit:  
→ <https://www.interreg-central.eu/Content.Node/SALUTE4CE.html#Events>

**Political support**



Fig. 10: SALUTE4CE project partners networking with the Mayor of Alessandria, Italy, to discuss action planning goals of the city (Photo: Wirth, 2021)

A successful action planning process and implementation of your UEA sites is largely dependent on political support within your city. Political support should be had at the beginning stages of planning and steadily improved upon throughout the planning process. Local political support should be obtained from the mayor or city council in the form of an approval letter or resolution. Political support is especially important when challenges arise in the planning process (implementation of tasks and actions) and can be important when presenting progress concerning project implementation. Additionally, visions, goals and targets need to be accepted and confirmed by local representatives. The political support gained early in the planning process will prove to be vital in the planning process in later. To maintain a dialog, the action planning team is recommended to inform the city council and mayor of the planning process and the potential of the projects implemented and which overarching planning goals they will contribute to (GreenKeys Team 2008).



**\*Tip: Publicizing and gaining support for UEA\***

- > In December of 2019 the SALUTE4CE project partners met in Erfurt in the City Hall with the Lord Mayor Andreas Bausewein. Discussions concerning the project and photo opportunities took place. Events like this can be used to gain support and momentum by bringing attention to the potentials of UEA.

→ <https://www.erfurt.de/ef/de/service/aktuelles/am/2019/134508.html>

### Financial support

Potential sources of financial support could be one or a combination of the following: citizen donations via city greening initiatives. The City of Dresden, Germany has created a city greening fund where donations are collected to support implementation, care and upkeep of parks and green areas within the city. Including the street trees and benches, monuments, and fountains. The city greening fund is completely supported through voluntary donations commitment from the mayor through the city budget (City of Dresden 2022). Your city if it does not already have something similar may consider creating such a greening fund. Further funds may be acquired through the European Union, federal or state funds addressing biodiversity or climate change adaptation or even funds collected as part of a lottery. In a more concerted effort funds could be created specifically for the purpose of greening the relevant municipality (GreenKeys Team 2008).

The results of the preparation step are:

- Formation of an action planning team
- Creation of a working plan with assigned tasks, milestones, and deadlines
- Formulation of planning goals
- Defining the planning area (Section 5.1)
- Identification of public, political, and financial support

Informing the public, create opportunities for further public involvement

## 2.2. How to gather and evaluate information in the analytical step? (Step 2)

After having conducted the preliminary or preparatory stage of action planning you should have identified those responsible for action planning, made initial contacts to residents and stakeholders and have become familiar with the potential opportunities and challenges with implementing UEA in your city. Visions and goals have already been developed and can be further refined if needed. The results of the preliminary step will guide the analytical step, as you should be familiar enough with your city to know which information will be important to analyse.

The analytical step consists of:

- Data collection (and generation if necessary)
- Creation of an urban green profile for your city
- Pre-selection of UEA sites (final selection later in the development step) (see Section 5.2)

#### Data collection (and generation if necessary) (What data should be collected?)

In the analysis step of the action planning it is necessary to review which information you will need to collect for your analysis (Fig. 11). It will be necessary to collect data to create a profile of your city and to conduct a pre-selection of UEA sites. The specific types of information required are discussed in this chapter. Nevertheless, the action planning team should have already identified some of the necessary information for your UEA projects in the preliminary step. The action planning team will have to do some research in order to identify which documents or information already exist. If some of the required data is not available, it may have to be self-generated via templates or surveys or acquired from an organization possessing the skills and tools (city administration, GIS offices, statistical offices, etc.). The process of generating data is a separate process. Keep in mind that the data collected or generated should be reliable and up to date in order to support proper decision-making and planning in the developmental step.



Fig. 11: Overview of questions to consider in the analysis step (Source: Authors' illustration)

### 2.2.1. Creation of a profile for your city

Here you will create a profile of your city relating to the UEA and the planned sites. This is an overview of features and conditions which will help in understanding how UEA may fit into the bigger picture and how it can contribute to green infrastructure. To do this, data should be collected and examined this includes demographics, the planning framework, the economic and financial circumstances as well as physical conditions.

#### General framework

The focus of data collection and analysis here are on understanding the main characteristics of your city.

The main characteristics described should be:

- Demographics
  - population size and future projections
  - population distribution
  - age distribution





- Planning framework
  - Administrative organization of departments related to green infrastructure
  - The planning and legislative context to see if there are policies or strategies that complement the creation of UEA sites.
  - Local, regional, national, international conditions and documents surrounding green infrastructure
- Economic and financial circumstances
  - Financial standing of your city
  - Financing possibilities for supporting potential UEA sites
- Physical conditions
  - Understanding the main physical conditions of your city and potential UEA sites
  - Begin to identify the key problems and the spatial hot spots
  - The main characteristics described here should be:
    - Surface area of the city with share of green space/green infrastructure
    - Information about areas selected for green spots (proportion of green, green structure, soil properties, plant and animal species, environmental hazards, etc.)
      - > Green networking and human resources
      - > Research complimentary strategies, projects, organizations, programs and possible future project that may be similar to your pilot project. By doing this, synergies can be discovered and taken advantage of helping to identify who may be interested in cooperating.
      - > Potential to gain support for UEA sites (i.e. design, implementation and maintenance)
      - > Number of residents within walking distance of UEA sites (if data available and analysis is possible at this stage)

Relevant documents: Thematic literature, special measurements, mapping, etc.

\*Information that cannot be obtained can be self-generated via instruments such as surveys (e.g. templates), mappings (e.g. flora and fauna) within respective cities.

## 2.2.2. Pre-selection of Urban Environmental Acupuncture Sites

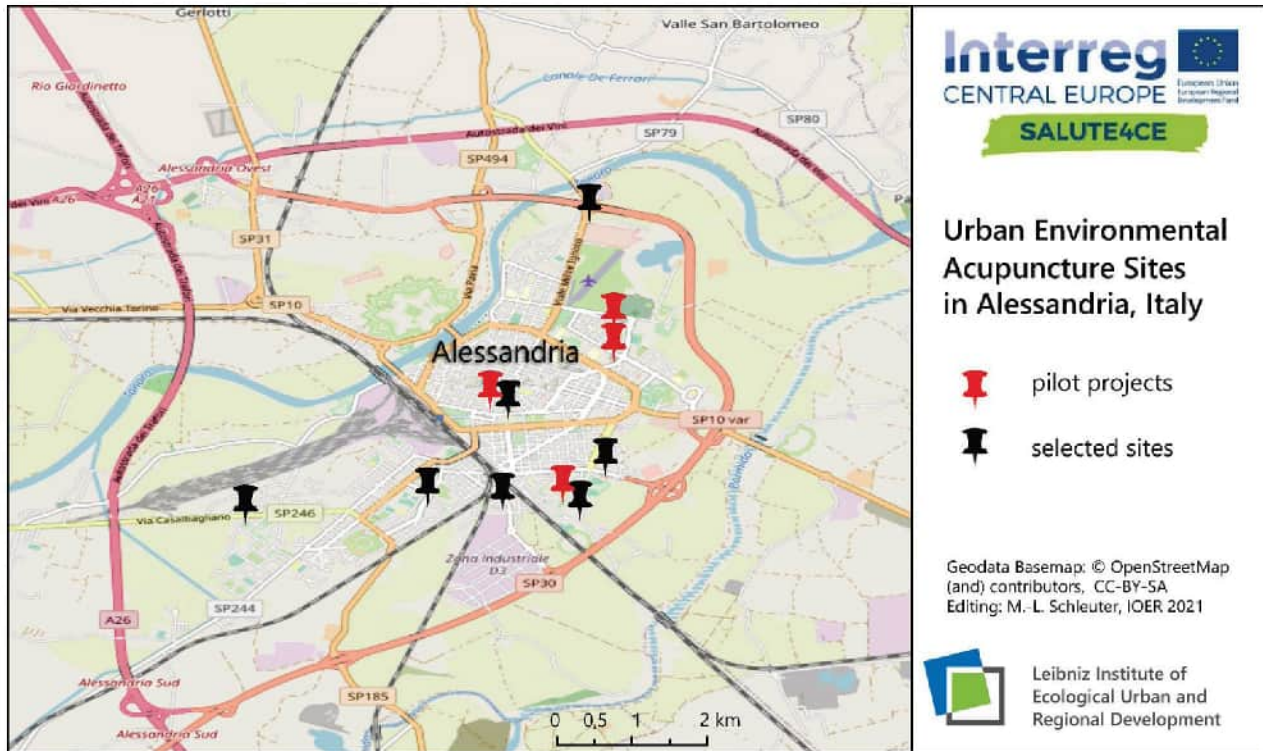


Fig. 12: Visualization of selected pilot project sites and further UEA sites in Alessandria

In the preparation step general visions were developed which should help to guide the decision-making process when selecting UEA sites. Figure 12 shows an example for pre-selected (black needles) and finally selected UEA sites (red needles). The methodology used here to select UEA sites has been developed by the Silesian Botanical Garden (SiBG) as part of SALUTE4CE project. Two large groups of assessment criteria have been designed for suitability for each analysed site and for the need of action. This includes a set of indicators used for scoring individual spots. The characteristics of the proposed green site itself and its spatial functional connections at the city scale are evaluated (SALUTE4CE, 2019). The process of selecting UEA sites (Fig. 13) should be completed by the action planning team together with local stakeholders. Chapter 5 of this guideline has been written based on the materials developed by Silesian Botanical Garden (SiBG) during the SALUTE4CE project (SiBG, 2020). Included are the expertise gained from project partners during the project work for action plan development as well as from discussions with professionals and citizens during several training seminars. There you will find information and methods that will help you to manage the action planning process including analysis procedures for characterizing the plan area (Section 5.1), for selecting appropriate acupuncture sites (Section 5.2) and for selecting suitable types of interventions (NbS, nature-based solutions) (Section 5.3).

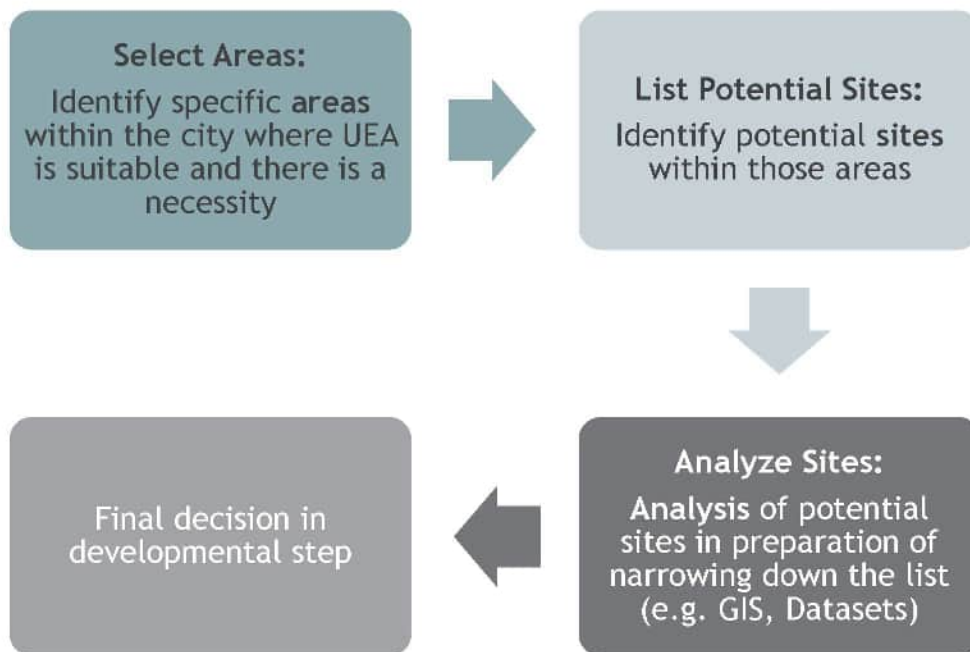


Fig. 13: Selection process of UEA sites to be conducted within the analysis step (Source: Author's illustration)

Documents such as city maps, GIS tools or other visuals showing the suitable areas for UEA and potential sites can aid in the site selection process. Before completing the analytical step, the action planning team should have acquired the information necessary to create the action plan in the next step. This entails, final selection of UEA sites, defining plan measures including specific targets and goals, and defining those actions and recommendations for the future. It is important that the action planning team reflect, and review data collected to ensure that all necessary data has been assembled. As a guide, the action planning team should review the working plan that was created in the preparation step to see if assigned tasks and deadlines have been met. Additionally, the visions and goals created in the preparation step can be reviewed, refined, and revised as the team sees appropriate. The team should also review the identified public, financial, and political support to see if anyone is missing from the list. Finally, the data collected concerning potential opportunities and challenges can be reviewed to determine if there are any remaining unanswered questions. To address the above-mentioned points, a review of Figure 14 may be helpful.

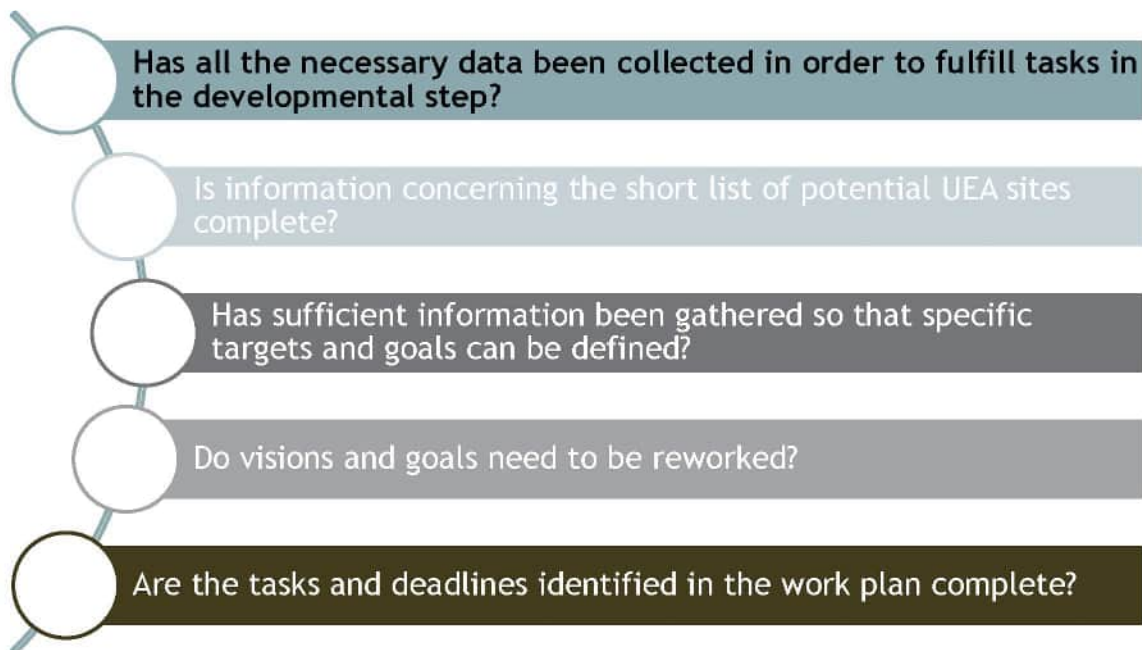


Fig. 14: Questions to be answered to reflect and review data collected in the analysis step (Source: Author's illustration).

Once all the tasks have been met in the analytical step the action planning team and stakeholders can move on to the developmental step where final decisions will be made concerning which actions will be implemented. At this point, all the tools necessary to create and implement an action plan for your UEA projects should be assembled.

#### Results of the analytical step:

- Assembly of required information
- Completed profile of the city
- A short-list of potential UEA sites including site analyses
- Involvement of the public in data collection and site selection
- Final list of measures

### 2.3. Plan development - formation of an action plan (Step 3)

Now that an overview of the general conditions, the physical situation and the extent of human resources are known, the action planning team should possess a broad and in-depth understanding of their city, the planning context and potential UEA sites. How knowledgeable the team is concerning their planning area and potential pilot project UEA sites is crucial in the decision-making process in this step. Therefore, it is important to have prepared well before reaching the developmental step where plan actions will be decided.



The general framework for the decision-making process moves from broad to specific. In that one has identified a specific problem within the city or city region which can be addressed by increasing green infrastructure. Many project partners of SALUTE4CE project identified extreme heat related to climate change as a problem for example. Vision and goals for the respective area should be well developed at this point. And a short-list of potential UEA sites has been created. This list will be narrowed down based on data collected in the analytical step and further reviewed. Public feedback is important in this process.

#### Final selection of UEA sites (see Section 5.2) and of NbS types (see Section 5.3)

Based on results of the analytical step a short list of UEA sites is already available. Subsequently, selection of the green site type and assessment of NbS applicability will be conducted resulting in a final selection of NbS. This should be based on the methodology developed by the Silesian Botanical Garden (detailed example see Section 5.3). Selection of the type of green spot to be implemented is based on the type of site that one is working with such as: traffic areas, multifunctional public areas, areas for peace/reflection, semi-public areas, or fallow (vacant) areas. Part of the decision-making process must include whether the original function of the site will remain the same, or if it is at all possible to transform the site into a certain type of UEA site (e.g. urban orchard, green roof, community garden, etc.). For further description of the technical features of UEA solution types see the box below which contains links to decision making tools developed as part of the SALUTE4CE project.

#### Defining plan measures

Based on the NbS selected, the action planning team will have to select actions necessary in order to implement the UEA sites. This includes targets or goals of the planned project, that is, what is the purpose of your UEA sites? Which NbS have been selected and what must be constructed? This should include planting greenery such as, trees, bushes, climbing plants and grass and where pertinent benches, small architecture, or gaming tables (For more information see Chapter 5). Your action planning team can further consider what restrictions exist after the UEA sites have been selected (i.e. whether certain features are permitted such as greenery or flowers requiring care or large trees).

#### **\*Tip: Information on Final Selection of UEA Sites\***

- > For information on UEA site selection see: Deliverable D.T1.2.1 called Principals for Selection of interventions
  - <https://www.interreg-central.eu/Content.Node/SALUTE4CE/SALUTE4CE-D.T1.2.1-FINAL-202008110.pdf>
- > For information on UEA selecting the appropriate NBS see: Deliverable D.T1.1.1 called common criteria of suitability and necessity pages 8-9:
  - <https://www.interreg-central.eu/Content.Node/SALUTE4CE/SALUTE4CE-D.T1.1.1-VERSION-final-31.01.2020.pdf>

## Public feedback on the planning process

### *Living labs*

Living labs are recommended within each city or urban area with local inhabitants and scientific partners (Fig. 15). Workshops should be organized locally together with project partners and other professionals. Living labs should consist of a guided discussion (e.g. round tables) and workshops in order to develop action plans for the UEA sites. This includes local and regional public authorities. The goals of the living labs should be to aid in criteria for selection of UEA sites, setting priorities and gaining knowledge from local stakeholders (SALUTE4CE, 2019).



Fig. 15: Planning urban green via living labs  
(Photo: © R. Vigh, IOER Media)

Living labs can be used to inform stakeholders and the public concerning the results of the preparation and analytical steps, especially as they serve as a platform to the developmental step. That means, reiterating who is responsible for action planning, which outreach activities have already taken place, which vision and goals have been developed as well as potential opportunities and challenges expected when implementing the small green spot. It is also important to provide an overview of the frame conditions, physical situation and human resources identified. Local stakeholders should be given opportunities to provide feedback on the results of action planning thus far, so that improvements can be made where necessary. The opinions and ideas of local stakeholders and residents (i.e. those that will be impacted by the implementation of a small green spot) are likely to be useful when deciding on an implementation strategy and therefore should be taken seriously. In this step decisions will be made concerning exactly which measures will be implemented.

For more information on living labs see section 4.2 of this handbook.

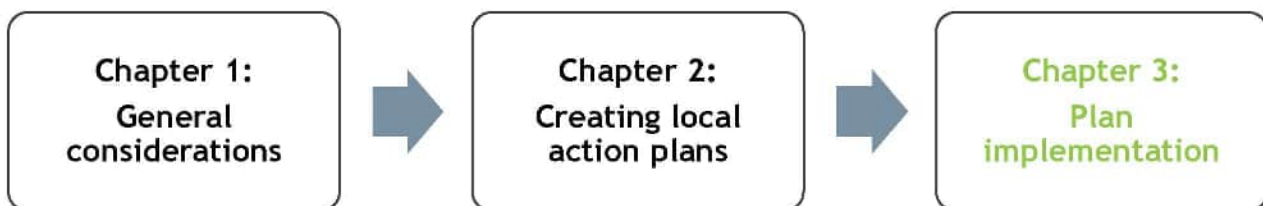


Results of the developmental step are:

- Public feedback on the planning process (i.e. via Living Labs)
- Action plan including:
  - Final selection of UEA sites
  - NbS for each selected UEA site
  - Selection of targets and measures
  - Deadlines to meet targets and measures

Proposal for the outline of an action plan see Annex 1.

## Chapter 3 - How to implement the action plan?



Implementation may be the most challenging part of the planning process. In many cases, a lack of implementation is a result of disproportion between the ambition of the planners on the one hand and the resources and capacity available to actually implement it on the other. Therefore, a proper analysis of resources and potentials is necessary.

Keeping this in mind, we will review the selected targets and measures and go more into detail concerning their implementation. Specific elements which should be documented for each measure will be mentioned in this chapter. Although it should be noted that situations may arise where it is deemed necessary to revise and adapt actions, if barriers are encountered. This may require a repetition of the analytical and developmental steps for some measures.

Three issues of plan implementation will be given particular attention:

- Implementation of set targets and measures (planting, installing equipment, etc.) in general. This includes the involvement of the population. The output is new UEA sites with completely implemented measures.
- Maintenance of UEA sites. Before any kind of vegetation can unfold its ecological functions, it requires much care. The output can be a maintenance and management plan including a time schedule.
- Monitoring of the process. It is important to have a long-term overview of the success of the measures. As a rule, it is based on selected indicators. The output is a monitoring and evaluation concept.

### 3.1. Implement set targets and measures

#### UEA site creation

At this point each of the action planning teams should be well prepared to implement their UEA sites. The preparation of the action plan began with general considerations considering project goals and how urban acupuncture would be utilized within the city or city region. It was preceded by the creation of local action plans as part of a three-step process: preparation, data analysis and plan development. Here action planning teams created visions for their cities with local actors and citizens, collected and analysed documents to gain a better understanding of the local situation. Resulting in readiness to complete the final selection of UEA sites including defining of plan measures, actions, and recommendations for the future. Finally, all these preparations have paid off and placed the team in a position to undertake defined plan measures, actions, and recommendations. This means you and your team are on the way toward action plan implementation and UEA site creation.

#### Revising and adapting actions if needed

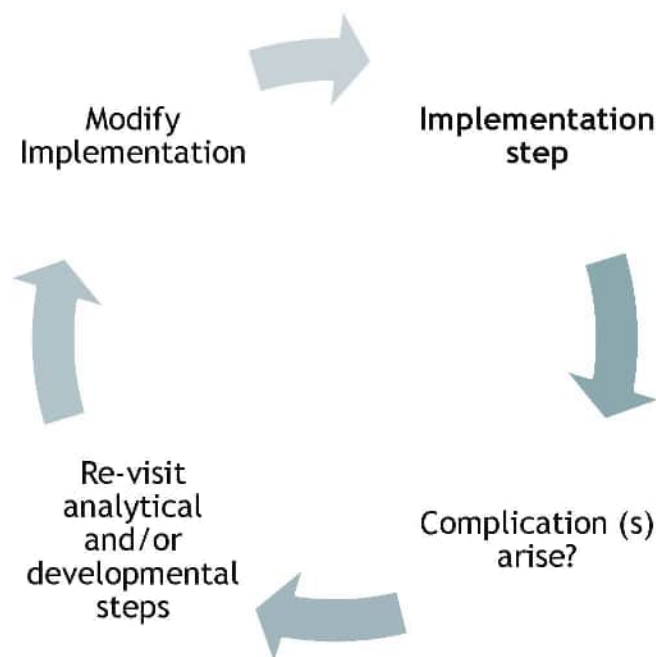


Fig. 16: If problems arrive revision may need to be taken in the implementation stage which may mean revisiting the analytical and developmental steps of planning (Source: Author's illustration)

If during plan implementation complications arise where implementation of certain measures is no longer possible it may be necessary to rework your action plan (Fig. 16). This would require partially repeating the analytical and developmental steps for certain measures. In this case it is wise for the action planning team to seek the counsel and inform external and local stakeholders and the project lead. It is important to communicate potential postponements in project implementation to avoid disappointment and to seek support where possible to minimize delays. If no complications arise, then you can skip this step of course and continue onward with the implementation step.



**\*Tip: Implementing set targets and measures\***

- > Each implemented action can be used to promote your UEA implementation activities. Social media such as twitter, already existing websites from your organization or newsletters, flyers and press releases can be used to publicise the progress made on implementing UEA (Coyle 2011: 57).
- > Signage or other forms of advertisements can be used to inform the public of the intended goals of each measure and which benefits are expected for the community as a result. This can also be a way to inform the public of the EU funding received.



Fig. 17: Example of signage used as advertisement for the project at a school yard pilot project in Alessandria, Italy (Photo: P. Wirth, 2021)

### 3.2. Preparation of a maintenance and management plan

“Nothing thrives without care and the most excellent things lose their value through unreasonable treatment.” This famous quote by the German gardener and landscape architect Peter Joseph Lenné is still relevant in landscape and green planning today. Green spaces are a long-term investment: it can take some time before they are able to fully provide their functions. To guarantee this, they need an adequate care as well as adequate attention by residents (Fig. 17).



For each of the UEA sites a maintenance and management plan should be prepared. It is important that the UEA sites are not only created but maintained for future use. Without proper care greenspaces especially those in high demand will exhibit signs of wear and tear. It would be a shame for the well-thought-out design of each UEA site to deteriorate shortly after implementation.

Potential barriers toward UEA site maintenance include a lack of a legal requirement, a lack of funding and uncertainty concerning who is responsible for maintenance (GreenKeys Team et al. 2008).

The action planning team will need to decide:

- What needs to be maintained and managed (considering both infrastructure and plantings)?
- Who will be responsible for maintenance and management of the UEA site?
- How often do maintenance measures need to occur?
- How will maintenance and management of the UEA site be funded?

The action planning team will need to examine each UEA site and decide what will be necessary to maintain in the future. This includes both infrastructure such as benches or gaming tables as well as greenery and plantings. Even something as simple as mowing the grass will have to be considered. How often does maintenance need to occur for each of the elements within your UEA site? How will maintenance and management be funded in the future? Partnerships between public agencies and private non-profits have been used in the past to maintain urban parks. Additionally, volunteers and businesses may have an interest in contributing to maintaining urban parks. Participation is crucial also in this step of green implementation.

**\*Tip: Gaining financial support in maintenance and management of the UEA site\***

- > Many UEA sites serve multiple purposes for example they contribute to city cooling, water retention and increased resident well-being. These contributions can be used to acquire financial support. If financial resources for maintenance and management are lacking consider gaining financial support from various organizations that benefit from UEA (i.e. city planning departments, parks or utilities and public health) (Nagel, 2017).

### 3.3. Monitoring of pilot project impacts

It is critical to review and evaluate measures for urban green spaces in order to determine whether the measure delivers the intended benefits (i.e. functional aspect) and to examine whether certain population groups might benefit less or more of urban green (i.e. aspect of fairness and social justice).



**\*Tip: Examples of monitoring and indicators from Alessandria\***

To monitor the impacts of the UEA sites in Alessandria specific indicators will be utilized.

This text taken directly from the action plan of Alessandria (Furia et al. 2021, p. 9-10):

- > Thermoregulation effect: the contribution of the tree vegetation present in the SALUTE4CE areas on the mitigation of air temperatures in their proximity will be evaluated, comparing it with the measurements made outside the cone of projection of the shadow of the foliage. The data will be collected at 9 a.m., 1 p.m. and 5 p.m. on the first 5 working days from April to September inclusive.
- > Increase in outdoor educational activities: the educational offerings will be supplemented with the possibility of holding lessons inside the Salute4CE areas. The school proposals will be active from March to June and from October to December. The number of classes involved will be reported monthly.
- > Evaluation of learning: considering the didactic/experiential value as fundamental, the aim is to evaluate the effective improvement of the pupils' learning capacity by means of lessons in the City of Alessandria.
- > Number of visitors to the areas per day: the number of visitors will be counted at 10 a.m., 3 p.m. and 6 p.m. on the first and third Sunday of each month from April to September inclusive.
- > Increase in the presence of pollinating insects belonging to the Order Lepidoptera and the Order Hymenoptera Superfamily Apoidea: counting through observation for 15 minutes, at 12.00, in the ring sown with wildflowers, weekly (only on sunny days) from April to August.
- > Biological monitoring: evaluation of the stress state of the plants grown in the city planters through photosynthetic efficiency measurements with a fluorometer. The measurements will be taken on an hourly basis, from 7.00 to 17.00, on a weekly basis and with a minimum number of 5 measurements on different leaves of the same plant.

To measure the impacts of implementing the UEA sites it will be necessary to select and develop indicators. First, consider what it is that you want to know about the effects of your UEA. This will be related to the anticipated impacts of the UEA site. For example, if the purpose of your UEA site is to counteract the urban heat island effect one would measure temperature reductions or increase in shade cover. If the purpose of the pilot project is to increase community interaction one might measure number of visits for a given time period and visitor origin. Regardless of the purpose of your UEA site, and respecting the relationship between ecological and social goals one will have to consider:

- How to monitor desired changes or impacts (i.e. what needs to be measured)?
- When and how often do indicators need to be measured?

Information related to resident satisfaction, indicators or UEA site usage can be collected via online or paper surveys, site visits i.e. inspection of pilot projects, environmental indicators based on the relevant jurisdictional methods and standards according the relevant project goals. Monitoring may vary according to the desired impact of UEA sites and be carried out by maintenance professionals, biologists, arborists, natural science professionals or trained volunteers. Checklists should be created which are used to examine both the landscape and other infrastructure on site (Coyle 2011: 254).



## Chapter 4 - Excuse Participation and Living Labs

As chapters 1 to 3 demonstrate, participation is an important part in creating action plans for UEA. Of course, professionals in planning, urban development and design are needed to push the public process, but - as we know from many examples - they cannot replace inhabitants and other urban green user's preferences, perceptions and knowledge on social needs and relationships. Consequently, an intensive and permanent exchange between experts and potential users is necessary to design urban green spaces.

In a traditional understanding, participation means forms of involvement, inclusion or integration of people. Participation can be seen as cooperation, communication and interplay in relation to public tasks and goals. It is often understood as a form of governance, involving people in political decision making and planning. Many people understand participation as a means for balancing inequalities of power between citizens and public administration. Following this idea, participation can contribute to build trust and make transparent the intricate procedures of planning. This is the understanding with which the concept of participation is used in this guideline. In addition to traditional methods of participation such as citizens' forums and planning workshops, we are also looking at new approaches that have emerged in recent years. We will pay special attention to Real World Laboratories or Living Labs, which focus on the joint learning of experts and citizens in the context of public projects. But at the beginning we look back on the roots of participation.

### 4.1. Participation in a traditional understanding - a critical review

There is plenty of academic literature about participation in public decision making and planning, in particular also in the field of environmental policy and management. Having a closer look at it, it can be distinguished two main notions of participation. One is interpreting public participation as a civil right in democratic societies (e.g. Calderon and Butler, 2019; Elling and Nielsen, 2017). In this notion it stands for the empowerment of people to take a stand for their civil rights beyond state authorities. Another one is highlighting participation as a tool to enhance the quality of public policies, decisions, programs and plans. In this notion it serves to strengthen the legitimacy of political decisions and to create acceptance (Jami and Walsh, 2014; Reed, 2008). Both notions together have formed over the last decades the general understanding of participation.

Under these general considerations, we can distinguish some typologies which seem to be appropriate both for conceptualizing participation and for designing practical participatory approaches which can be seen as well-established (e.g. Jami and Walsh, 2014; Reed, 2008).

At *first*, we can find a typology based on different degrees of participation on a continuum. Jami and Walsh (2014) proclaim that participation can mean to inform, consult, involve, collaborate, or empower people, in a close relation to Sherry Arnstein (1969) (Fig. 18) who drafted a "ladder of participation" as a metaphor for different intensities of people's involvement in planning processes. The ladder consists of eight rungs describing the level of participation from the lowest to the highest. The steps can be divided into three categories: non-participation (manipulation, therapy), tokenism (information, consultation, involvement) and civic influence (partnership, delegated power, civic control). Though the model of Arnstein was published more than 50 years ago, it has still a guiding function in recent debates: When the involvement of people is used to manipulate them, we can hardly speak about participation. Also, today we can observe that state authorities try to get acceptance for public projects without revealing all consequences and impacts. Tokenism stands for the symbolic and dutiful involvement of the population in state decision-making processes. The aim of such participatory processes is not to improve projects or even to design them completely differently than planned, but to gain blanket approval. If one follows Arnstein's model further, real participation only takes place when citizens are recognized as partners in



Fig. 18: The ladder of participation as created by Arnstein (1969) - a milestone in participation research

planning processes, when they can co-decide on public projects or are even involved in them.

The *second* typology is focusing on the forms, formats and techniques of participation and the direction of communication flows. As techniques of participation Jami and Walsh (2014) state referenda, hearings, surveys, negotiated rule makings, consensus conferences, citizen juries/panels, citizen advisory committees, and focus groups. As indicated, the form of participation needs to be in line with the purpose. In younger times the variety of participation formats increased. One opportunity to integrate civil society intensively in urban development is living labs. We will come back on this format later.

The *third* typology focuses on the normative principles of participation. As important aspects to achieve acceptance for public policies and decisions are seen fairness and justice. The fairness of outcomes and process justice can be understood as a precondition for public acceptance (Innes and Booher, 2004). Deficits in justice and “the general feelings of loss and control” can provoke opposition

e.g. against infrastructure projects (Cain and Nelson, 2013). Nearly all researchers underline that participants must have a real influence on the result and that the mandate for the participants, but also the limits of their influence should be clear from the beginning of a planning or decision making process.

Other studies - this leads to the *fourth* typology of participation - are highlighting success factors of participation like the openness of the process, the involvement of lay knowledge, and social capital building on local level (including creating a network of actors during the implementation) (e.g. Drazkiewicz et al., 2015). Whereas participation can be seen on the one hand as a “planner-centred” process, suitable to legitimise planning decisions, it can be seen on the other hand as “people-centred” to develop local democracy and to empower stakeholders (Michener, 1998). Also Nanz and Fritsche (2012) highlight the potential benefits and the relevance for the involved parties in participative processes. They interpret participation as a form of preserving and regaining of political scope for action and the creation of new places for deliberative co-determination.

When we summarise these typologies we could come to the result that the higher the quality of participation is the better are the results of planning processes as well as their acceptance (e.g. Reed, 2008). But there is also a lot of scepticism when we look at the practical experiences. Participation would often be “insufficient and strongly controlled by the authorities” (Elling and Nielsen, 2017, p. 11). “The literature often romanticizes participation.” (Hurlbert and Gupta, 2015, p. 101). Frequently contributors in participation processes perceive the methods as inadequate and inefficient. Also in other contexts there is still a “gap between citizen expectations and satisfaction with participation” in local decision making (Weymouth and Hartz-Karp, 2019). If we look critical on the recent practice, public planning processes usually fall far short of the idealised concepts in terms of public participation.



## 4.2. Living labs - an opportunity for common learning and the co-production of knowledge

Since several years the idea of so called Real World Laboratories or Living Labs has attracted attention in practice and science. What is behind this idea? Living labs can be seen as public-private-people partnerships including actors from research resp. development on the one hand and actors from practice on the other hand, being able to produce societal innovation (cp. Pallot 2009). Often these partnerships work in a spatial context like neighbourhoods, cities or regions. Issues of performance are very different, but mostly connected to sustainability and transition topics (Schäpke et al. 2018, Rogga et al. 2018). Examples are renewable energies, urban transport systems, circular economy, as well as organic food production and consumption. The strength of the living lab approach is that it allows the co-production of knowledge, including the theoretical knowledge of researchers or developers and the experience of the practitioners. Citizens play an important role in the whole collaboration process. The involved stakeholders work without a top-down constellation. They collaborate in the whole process of knowledge generation, starting with the definition of objectives (co-creation), continuing with shaping the real-world process (co-production) and finally assessing the results (co-evaluation). When this takes place in the form of a real-world experiment, we speak about a living lab(oratory).<sup>1</sup> In the SALUTE project, living lab approaches were foreseen in all cities in the four participating countries to promote Urban Environmental Acupuncture Processes. Following, concepts and results of the cities are wrapped-up.

## 4.3. Experiences of the SALUTE4CE project partners

### 4.3.1. Impulsregion Erfurt, Weimar, Jena, Weimarer Land (Germany)

Various citizen participation activities took place in the impulse region. Actors from different sectors of society participated to get involved in the local concepts of UEA in Erfurt, Weimar, Jena and Apolda (Weimarer Land). By having together people with different backgrounds and experiences, it was intended to reduce the complexity and uncertainty of the problems and to find sustainable solutions. In this way, the recommendation of types of measures could be more closely discussed and decided in the end.<sup>2</sup>

In Erfurt the Garden and Cemetery Office of the city upgraded the open space around the football field at Körnerstraße 10 in the Herrenberg neighbourhood.

In the course of the planning process, residents were invited to contribute their wishes and suggestions on 18 August 2020 at the so called "Neighbourhood Sofa" - a special form of public hearing (Fig. 19). Between 3 and 6 p.m., interested parties could make their suggestions on the sofa which was placed directly in the planning area. The planners and city officials collected ideas and answered citizens' questions. Ideas of the people were collected on posters and rough sketches were designed. For those who were not able to attend the event it was possible to send their opinions and proposals to the Garden and Cemetery Office via e-mail. Basing on the proposals, the plan was drafted. Due to the COVID-19 pandemic, public participation could not be performed as originally expected. Albeit, there were several inspiring ideas included in the UEA concept of the Impulsregion.

<sup>1</sup> For a more comprehensive overview on living labs see the subchapter 6.2.1 „From Participatory Processes to Living Labs“ by Elena Masala, Giulia Melis and Matteo Tabasso, LINKS Foundation, Torino, in the SALUTE4CE handbook.

<sup>2</sup> See the action plan report of the Impulse Region



Fig. 19: "Neighbourhood Sofa" in Erfurt; a participation format to involve citizens in green area planning (Photo: C. Bachmann/Impulse Region)

The result is impressive: Now elderly people, families and young people can find there play facilities, benches for resting and a barbecue area on the open space. At the same time the square has become more natural. More greenery is providing now shade. Planting areas with herbs and fragrant plants invite people to discover them.

#### 4.3.2. Alessandria (Italy)

In the Italy case study four different projects called "The urban orchard", "The refuge forest", "The city's green lung" and "The greenery in the city centre" have been implemented. These green areas were designed to make advantageous use of the functional characteristics of trees: protection from chemical, visual and noise pollution, improving the thermo-regulating capacity and support for the wildlife in the city, encouraging opportunities for socialising, and educational activities. Different types of plants were used in order to compare their ability to resist the effects of climate change and urbanisation.

In the context of the Alessandria action plan, a participation concept was implemented through:

- Public information/communication: public policy makers transmit information to stakeholders. The information flow is one-way: stakeholders are not actively involved, no input from them is expected or required.



- Public consultation: policy-makers receive feedback from stakeholders as part of a process initiated by them. The contributions collected are perceived as representative of social views on the issue.
- Public participation: citizens, stakeholders and policy-makers exchange information to influence and improve planning concepts.<sup>3</sup>

Main participation activities in Alessandria were a local stakeholder workshop and an interactive planning process with school children. The 3-hours local workshop on 7<sup>th</sup> September 2021 was organized by LAMORO (Regional development agency), led by Links Foundation Torino (Academic partner) and hosted by the Municipality of Alessandria. The meeting was attended by 23 participants, mainly planners, officials from local and regional administrations, representatives of NGOs and school teachers.

The main objectives of the workshop were to inform all stakeholders about the intended transformation of urban green spots in the city as well as getting feedbacks from stakeholders on the proposed projects. Furthermore, the idea was to involve them in the definition of possible management models for green spots through the participation of citizens, associations or informal groups. Following the idea of living labs, the workshop was designed in a co-design mode, bringing together experts and laypersons with their different knowledge and experience, to produce common results.

Firstly, participants were introduced in the main principles of Urban Environmental Acupuncture, the peculiar characteristics of the main nature-based solutions (NbS) proposed within the project and the participatory planning processes that could be activated for the care and maintenance of urban greenery. Following, the participants were divided in 4 groups and each of them was asked to develop an idea about a possible UEA project on 4 of the areas included in Alessandria Action Plan, not selected as areas of investment. To be able to do that, a set of materials was provided to each group including:

- a map of the area to work on (different for each group);
- the NbS cards, in which 30 Nature Based Solutions were graphically illustrated;
- a blank poster to support the participatory planning process;
- pens, post-it notes, pencils, etc. ...

Each group worked for about 45 minutes under guidance. After the working session, a spokesperson of each group illustrated the solutions found out during the co-design process.<sup>4</sup>

Special attention was paid in Alessandria on involving children in the planning process. In agreement with the headmasters and teachers, the pupils were involved in the implementation of action plan development: with the assistance of the municipal technicians, the students actively participated in the field measurements and staking out activities, during which the precise positioning of all the plants and furnishing materials in the project was decided (Fig. 20). Unquestionably, this method of proceeding generates different added values that favour a responsible, sensitive use of urban green areas by potential users.

There have been important episodes of spontaneous involvement: among these, a first example was an unexpected letter written by the children of the Villaggio Europa School and addressed to the Botanical Garden of Alessandria, with which the children wanted to signify their weekly commitment to the care of the Urban Orchard.

<sup>3</sup> See the Action Planning Report of the city of Alessandria.

<sup>4</sup> Based on the Local Workshop Report of the city of Alessandria.





Fig. 20: Demonstrating school children the implementation of planning measures in Alessandria, project “Urban Orchard” close to the primary school “Villaggio Europa” (Photo: Max Dorigo Visuals)

A second example concerns the Refuge Forest, which saw the creation of a “Morando School Parents Committee” that wanted to contribute through extraordinary maintenance and permanent artistic creations, to making the area even more pleasant and significant. A third example has been the welcoming of participants of the international SALUTE4CE delegation by school children during the project workshop held in Alessandria in October 2021.<sup>5</sup>

#### 4.3.3. Liptovský Mikuláš (Slovakia)

As part of the SALUTE4CE project, members of the public were invited to join discussions - so called living labs. They were organised at the local level together with the project partners, the residents, the relevant experts, representatives of the municipal authorities of the town and the surrounding municipalities, representatives of civil society organisations, etc. The objective of the living labs was to cooperate in proposing criteria for selecting urban acupuncture sites, and to set priorities and gain knowledge from local stakeholders.

As part of the development step of the action plan for Liptovský Mikuláš, the residents of the Podbreziny housing estate were involved in a public meeting in November 2019. The aim of the meeting was to present and to discuss the architectural design of the pilot project “Revitalization of the inner block in the Podbreziny housing estate”. The residents specified the location of tree planting, benches, etc. The ideas and requests of the public were subsequently incorporated, processed and reflected in the elaboration of the plan.

<sup>5</sup> Based on a typescript provided by Jody Abate (City of Alessandria).

An impressive and challenging example of collaboration in the form of a living lab was the “Grand Mamas Garden” project at Demänovská Elementary School in Liptovský Mikuláš. The goal of the project was to create a rustic orchard following the model of a former farmer garden, neighbouring to an elementary school. The green spot concept was accompanied by a number of pedagogical objectives of the project:

- development of children’s perception of landscape as a basis of existence (as a counter-position on gradual underestimating the importance of biodiversity and agricultural land),
- development of children’s capability on learning from history (grandmas knowledge),
- development of affective and cognitive skills (not everything old is bad and the wisdom of ancestors must be preserved) and
- development of a sense of responsibility for the design and realization of the garden (unlike computer games, a badly created garden cannot be deleted by the touch of a button).

Guided by a landscape planner and some teachers, the children were motivated to arrange typical elements of a former farmers garden to an overall design concept (Fig. 21): fruit trees and bushes, ornamental plants, medicinal herbs, meadow with field flowers, house for insects, bird boxes, fences and lanes, sayings and superstitions. This was embedded in a half-year creative process.



Fig. 21: Pilot project “Grand Mamas Garden” in Liptovský Mikuláš (Source: M. Petran, 2021)

The exhibition of children’s works took place in October 2021.

The garden serves now as an open-air classroom, and the children have taken over the maintenance of the garden. The example shows that small green has not only a potential to improve physical ecosystem services, but also to achieve pedagogical objectives like the improvement of closeness to nature and historical awareness. The whole living lab process was recorded in a film documentation.



#### 4.3.4. Chorzów, Ruda Śląska and Świętochłowice (Poland)

The Polish case study area included the cities of Chorzów, Ruda Śląska and Świętochłowice. The activities in the framework of SALUTE4CE project have a close relation to the Integrated Development Strategy of the city region by 2030.

In the process of developing the action plan, stakeholder and resident representatives had the opportunity to participate in the formulation step of the action plan, the selection of potential UEA sites, and the verification of sites through the methodology adopted by the project team. Participatory activities included public consultations, discussions, meetings, workshops and exploratory walks. As part of the initial step of preparing the action plan - searching for potential locations of UEA sites in the cities of Chorzów, Ruda Śląska and Świętochłowice - a consultation point for residents was installed in October 2020 at the market square in Chorzów, with representatives of the Institute of the Ecology of Industrial Areas (IETU), Chorzów City Administration and the Silesian Botanical Garden. In the step of assessing the suitability of individual sites and the need for their adaptation to UEA sites, exploratory walks and workshops were conducted in individual cities, attended by representatives of city administrations, local institutions and organizations, IETU, Silesian Botanical Garden and the experts drawing up the action plan.

In the framework of the SALUTE4CE project, representatives of the local community, stakeholders and different types of institutions and organisations were invited to participate in the discussions within the so-called living labs, which include public presentations, discussions, meetings, workshops. The living labs were organised on a local level together with project partners, citizens and relevant experts. The aim of the living labs was to gain knowledge from local stakeholders (inhabitants, civic associations, experts), to identify priorities and to obtain bottom-up knowledge about needs and opportunities, in line with the ideas of public participation.<sup>6</sup>

To go deeper into the action plan development, the representatives of involved cities in Poland used a participation format called exploratory walks. All together four of these walks have been organised in Chorzów (Fig. 22), Ruda Śląska and Świętochłowice. The aim of the exploratory walks was to assess and discuss interventions proposed in the action plan with local experts and citizens. They were guided by team members of the Botanical Garden and the designer of the action plan draft. The walks lasted 2 to 3 hours. The participants covered up to three kilometers. In order to save time, in one case a distance was covered by car. At each acupuncture site indicated in the action plan, the experts discussed with the persons residing in the neighborhood or being involved in the maintenance of the site area. These actions enabled the planners to indicate the best solutions dedicated to each site and support the implementation process. Close cooperation with the citizens and including them in the co-creation process leads to a better mutual understanding. In all cases, 10 to 15 people took part at the walks. This group size is also recommended for further activities, as it allows an effective discussion. And finally, the walks lead to considerable changes in the action plan, for instance in the selection of species. Moreover, responsibilities for the maintenance of UEA sites could be specified.

**Due to dynamically changing restrictions resulting from the pandemic situation, the meetings in the Polish case study area were conducted in several forms: outdoor and online meetings or meetings in a café respecting sanitary requirements.**

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<sup>6</sup> Based on the Chorzów Action Planning Report as well as the Capacity Building Report, including additional information from Marta Fudala.



Fig. 22: Exploratory walk to identify green spaces for Urban Environmental Acupuncture in Chorzów, April 2021 (Photos: M. Fudała, Institute of the Ecology of Industrial Areas, Katowice)

#### 4.4. Citizen participation in UEA action planning - lessons learned

The examples show that the participating cities and city regions in SALUTE4CE project took on substantial efforts to involve stakeholders and citizens in different steps of action plan creation and implementation. To sum-up the activities of the cities, they are mirrored by the four typologies presented at the beginning of the chapter: intensities, forms/techniques, normative principles and success factors of participation.

Firstly, we can find a wide spectrum of participation *intensities* including information, consultation and deeper involvement. In all cases, the different intensities are part of a step-by-step process, starting with information campaigns, and ending with more or less intensive forms of cooperation. As we can see, the *forms/techniques* of involvement are heterogeneous. There have been organized information points, public discussions, forums, hearings, workshops, and on-site meetings. The partners were creative in performing meetings. In particular, the “Neighborhood Sofa” in Erfurt and the “Exploratory Walks” in the Polish case are inspiring forms of participation. All partners interpreted the living lab concept in different ways. In several cases living labs were organized as a one-day workshop, involving stakeholder and user groups in creative processes, following a given dramaturgy (as we could see in Alessandria). The most intensive and most challenging living lab approach was the creation of “Grandmas Garden” in Liptovský Mikuláš. In a half-year process, a farmer’s garden was created close to an elementary school involving the



children in the creative process. The project combined urban green objectives with a pedagogical approach.

In all observed cases, *normative goals* were formulated to support fairness and justice in the planning process. The cities made considerable efforts to involve people in all steps of the planning process. We can learn from this how people can be involved:

- In the preparatory step of action planning it is of crucial importance to inform the public on the foreseen activities. Inhabitants should be informed on the general idea of UEA as well as on objectives, contents, timeframe, milestones and opportunities for participation in the course of the planning process. This may happen via press releases, official bulletins of the cities and social media. An overall vision and a slogan like “Make our city/neighbourhood a better place to live” can be helpful to attract attention. And it is also the moment to inform on the intention to organize a green living lab.
- In the analytical step involvement has to be forced. Now it is important to integrate the knowledge of people on deficits in urban greenery, potential green spots and ideas to develop them. This can happen via information points and public hearings. But it is also possible to organize a public competition for the best ideas. When living labs are existing, workshops have to be organized, respecting the different target groups, may be entrepreneurs, young people, families and seniors.
- In the development step the work culminates with selecting the definite green spots and the intervention measures. This is also the moment when the ideas of a competition are evaluated by a jury and the winners are awarded prizes. The platform for this can be a public event where the action plan is presented and the winners and their ideas are awarded. An intensive media involvement can make this event more important

All in all we can say that participating cities went a big step towards opening green infrastructure planning processes for the public. Albeit, there is further space for improvement, and what was reached in pilot projects has still to be transferred in local norms for further creation of urban greenery. The action plans elaborated in SALUTE4CE can be seen as a guidance to go this way. What we also could see is that some cities used already existing action groups to include UEA activities. Here we can think on Local Agenda groups basing on the Earth Summit (UN Conference on Environment and Development) held in Rio de Janeiro, in 1992. Such groups are existing in many cities and they may have a potential to organize participation of inhabitants in urban green planning processes including living labs.

## Chapter 5 - Excuse on Identification of Green Deficit Areas and on Selection of Green UEA Sites and NbS

Chapter 5 has been written based on material developed by the Silesian Botanical Garden (SiBG) during the SALUTE4CE project. Included are the expertise gained from project partners during the project work for action plan development as well as from discussions with professionals and citizens during several training seminars.

In this chapter, you will find information and methods that will help you to manage the action planning process. Here, we go into more depth on analysis procedures for characterizing the plan area (Section 5.1), for selecting appropriate acupuncture sites (UEA sites) (Section 5.2), and for selecting suitable types of interventions (measures, NbS types) (Section 5.3). An overview of the objectives and results of each section is provided in Table 2.



Tab. 2: Overview of aims and results of Sections in Chapter 5

| Section/Aims                                     | Results   |
|--|---|
| 5.1: IDENTIFICATION OF URBAN GREEN DEFICIT AREAS | <ul style="list-style-type: none"> <li>▪ Identification of specific area(s) within the city where UEA is appropriate and action is needed (areas to be included in the action plan).</li> </ul>   |
| 5.2: SELECTION OF ACUPUNCTURE SITES              | <ul style="list-style-type: none"> <li>▪ Identification of potential acupuncture sites within the area(s)</li> <li>▪ Selection of acupuncture sites with the highest need for action and the best suitability</li> </ul>  |
| 5.3: SELECTION OF SUITABLE INTERVENTION TYPES    | <ul style="list-style-type: none"> <li>▪ Selection of potential NbS types (intervention types, measures)</li> <li>▪ Assessment of the suitability and benefit of individual NbS types</li> <li>▪ Comparison of the suitability and benefits of different NbS types</li> </ul> |

## 5.1. Identification of green deficit areas for the action plan

We speak of urban green deficit areas when specific standards for public access to green spaces of suitable size and green quality are not met in an urban area. As a reference, we can use the applicable or recommended standards in our sample cities. For example, a permanent deficit exists when there is no possibility for the realization of large green spaces (over 0.2 ha) due to building density. Therefore, the inclusion of small areas in the action plan provides an opportunity to reduce the deficit and improve the situation of residents.

The identification of the green deficit area for the action plan is carried out with the help of the analysis sheets for Section 5.1 (Annex 2-1, Annex 2-2). The area diagnosis is filled in there using an example from Erfurt (Germany) (Fig. 23, Fig. 24).

At the beginning of the action planning process, a 'city profile' is created with the help of Annex 2-1 and thus the potential green deficit area is determined. This will include analysis of green space provision and access, demographic conditions, the existing planning framework, and the city's economic and financial situation. The information will be compiled by the planning group to determine the green deficit areas in the city.

After characterizing a potential urban green deficit area, the task is to determine what the reasons are for implementing the action plan in that area. For this purpose, the **need for action and the suitability as an urban green deficit area** are determined. Annex 2-2 provides tables of possible reasons for both the need for action and the suitability. Using all available information in terms of need for action and suitability, you can evaluate the area and make your decision based on that information. The question is: Do sufficient reasons speak for the implementation of the action plan, i.e. for the implementation of UEA in this area?

Predestined for inclusion in the action plan are those areas that are characterized by a significant need for action and at the same time by a particular suitability. These are areas where the deficit of publicly accessible green space can only be reduced by creating small green spaces, because it is not possible to develop larger green spaces. Annex 7 shows the boundaries of the green deficit area in Erfurt (Germany) with the potential acupuncture sites.



Fig. 23: Planners filling in analysis sheets in Erfurt. Photo: J. Mathey

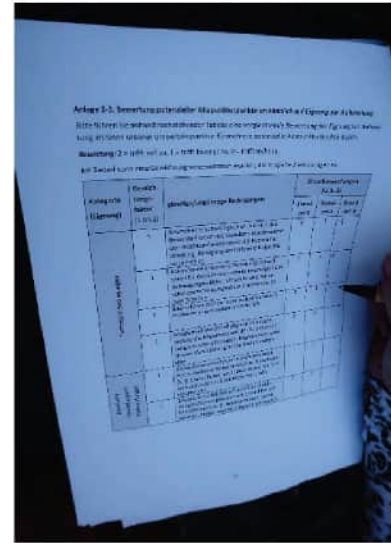


Fig. 24: Filled in analysis sheets in Erfurt. Photo: J. Mathey

## 5.2. Selection of UEA sites

An important step in establishing local action plans is the selection of appropriate acupuncture sites, i.e., areas for implementing "urban environmental acupuncture" (UEA). This is done in a multistage procedure (Fig 25), in which a list of potential acupuncture sites is first compiled with the aid of obligatory criteria, after which acupuncture sites with the highest need for action and best suitability for upgrading are then selected using further criteria.

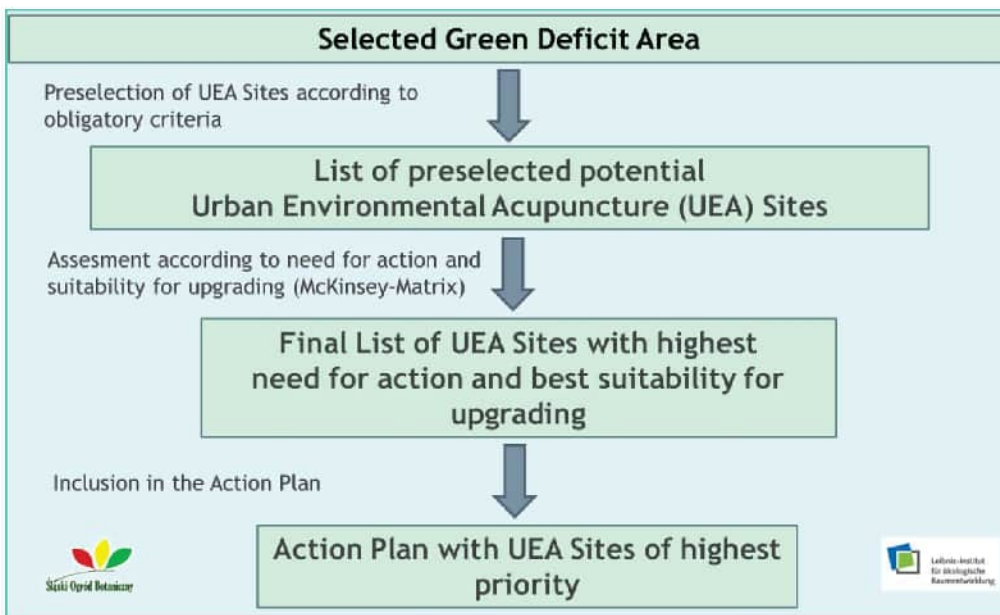


Fig. 25: Selection of acupuncture sites of the highest priority for the action plan



### 5.2.1. Pre-selection of acupuncture sites according to obligatory criteria

Within the selected green deficit area, a list of potential acupuncture sites is created based on obligatory criteria. Obligatory criteria are: Availability of the area, need for redevelopment, clear legal status and clarity on the permitting process, fit with existing/planned infrastructure, consistency with existing plans, programs, or projects, and absence of conflict with local stakeholders. The assessment of sites with respect to the obligatory criteria can be determined with the help of the analysis sheet for Section 5.2 (Annex 3-1).

In the analysis sheet, the obligatory criteria must be checked for each eligible site to determine whether they match or not. Only sites for which all obligatory criteria are completely fulfilled are to be considered in the further evaluation.

### 5.2.2. Evaluation of potential acupuncture sites with regard to the need for action

The next steps are to select the highest priority acupuncture sites. Pre-selected potential acupuncture sites are evaluated (1) in terms of need for action and (2) suitability for upgrading in terms of urban environmental acupuncture. An analysis sheet for the evaluation of potential acupuncture sites according to the need for action can be found in the Annex 3-2. For the determination local plans, policies, programs, diagnoses, reports, and data available on digital platforms are consulted. A McKinsey matrix is suitable for evaluation (Fig. 26).

### 5.2.3. Evaluation of potential acupuncture sites with regard to suitability for upgrading.

As just stated in section 5.2.2, the next steps are to select the highest priority acupuncture sites. Pre-selected potential acupuncture sites are evaluated (1) in terms of need for action and (2) suitability for upgrading in terms of urban environmental acupuncture. An analysis sheet for the evaluation of potential acupuncture sites according to suitability for upgrading can be found in the Annex 3-3. For the determination local plans, policies, programs, diagnoses, reports, and data available on digital platforms are consulted. A McKinsey matrix is suitable for evaluation (Fig. 26).

### 5.2.4. Combined assessment of the need for action and the suitability of potential acupuncture sites using the McKinsey matrix.

The combined assessment of the need for action and the suitability of potential acupuncture sites is carried out using the McKinsey matrix via a point system into which the aims of the action plan are incorporated with different weightings. Each potential acupuncture point can be reflected in the McKinsey matrix by a valuation - as a point in the diagram - in the green, yellow or red fields (Fig. 26).





Annex 3-4 explains the procedure using the example of two locations in Erfurt (Germany).

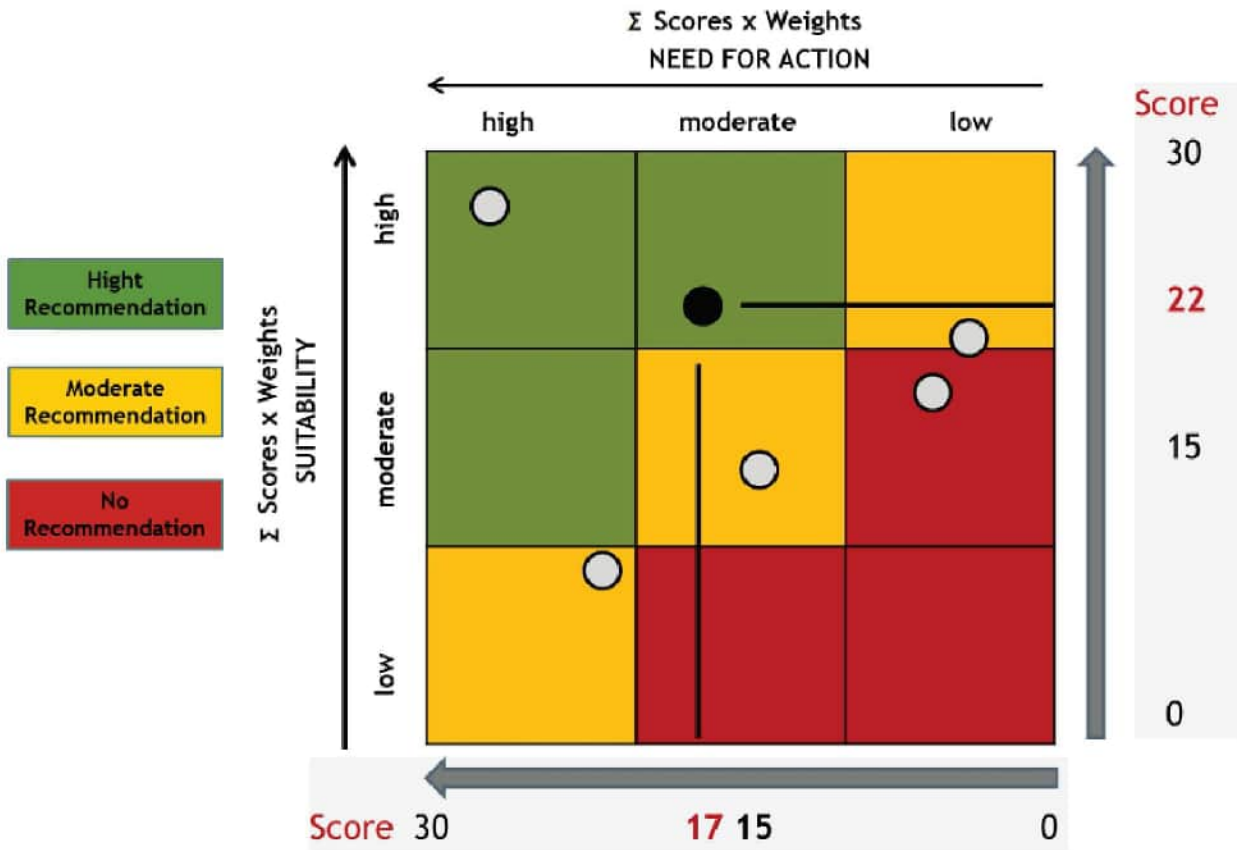


Fig. 26: McKinsey matrix: Example for the evaluation of a potential acupuncture site. Example (black dot, red numbers): Total score for need for action = 17, total score for suitability = 22. Maximum possible total score (black numbers) each = 30; white dots other examples. Source: SiBG, 2020

Finally, the acupuncture sites that show the highest need for action and the best suitability, i.e. to be found in the green fields of the McKinsey matrix, are included in the action plan. If this is not sufficient, areas from the yellow fields (medium need for action, medium suitability) are added.



Fig. 27: Participants listening to Erfurt planners' explanations on ideas for site development. Photo: C. Bachmann

### 5.3. Selection of appropriate types of interventions (types of NbS)

The determination of the "needles", i.e. specific measures at the acupuncture sites, is also carried out in a multi-stage procedure in which nature-based solutions (NbS) are examined with regard to the fulfilment of obligatory criteria (Annex 4-1), their suitability as an intervention measure (Annex 4-2) and their benefit for the acupuncture point or for the aims of the action plan (Annex 4-3). Supported by information in Annexes 5 and 6, data already collected will be analysed for this purpose.

The European Commission defines nature-based solutions (NbS) as solutions that are inspired and supported by nature, which are cost-effective, simultaneously provide environmental, social and economic benefits and help build resilience (EC 2021). "In cities, the focus is on incorporating natural elements in new development designs—increasingly through planning policy—under the umbrella of green infrastructure (GI) to maximise social, environmental, and economic benefits (Tzoulas et al., 2007; Pauleit et al., 2019)." (in Coombes et al. 2021)

Examples for UEA suitable NbS are: urban meadows (Fig. 28), street trees (Fig. 29), road-side swales for retention and infiltration, green facades with climbing plants (Fig. 30), green pergolas/green arbours (Fig. 31), green pavements, rain gardens in planter, ground crops of vegetables/herbs (Fig. 32), urban wilderness/succession (Fig. 33), natural pollinators' modules.

A total of thirty NbS suitable for Urban Environmental Acupuncture were identified in the SALUTE4CE Handbook on Urban Environmental Acupuncture. There in chapter 7 all thirty NbS are briefly described in terms of its characteristics and function, such as the main ecosystem services provided as well as potential problems (Vojvodíková 2022).

Annex 5 describes nature-based solutions suitable for urban acupuncture. In order to assess the potential benefits of the respective nature-based solutions for the selected acupuncture sites, Annex 6 compiles selected potential ecosystem services (ESS) for the NbS types. The final selection of NbS types can also be supported by the McKinsey matrix (Annex 4-4). This is the last step in the planning process.



Fig. 28: Urban Meadow. Photo: P. Wirth



Fig. 29: Street Trees. Photo: R. Bendner



Fig. 30: Green Façade with Climbing Plants.  
Photo: J. Mathey



Fig. 31: Rose Arch in Allotment Garden.  
Photo: R. Bendner



Fig. 32: Ground crops of vegetables/herbs.  
Photo: A. Seiwert



Fig. 33: Urban Wilderness/Succession. Photo: R. Bendner



## Chapter 6 - Summary of action planning in SALUTE4CE cities or urban areas and suggestions to improve the planning process

Below is a summary of the action planning presented in this report, which provides a solid basis for understanding and improving action planning processes that incorporate UEA both now and in the future.

### 6.1. Summary of action planning in SALUTE4CE pilot projects

Within the action planning summaries of each city or urban area we see both similarities and differences in the way planning was carried out despite having a transnational action plan concept (Hemingway et al., 2020) which guided planning. This is a good thing because this means that the concept was flexible enough to accommodate the unique needs of each pilot project. As we see from the English summaries of action plans, a variety of actors were involved in completing the action plan including city employees, garden and greenery offices, city planning offices, office managers, consultants, and students. Just within the plan writing we see a diversity of actors coming together to implement UEA. Action planning goals vary for each city or urban area for example Liptovský Mikuláš and Chorzów have been focused on addressing abandoned spaces and urban beautification/revitalization. Whereas Alessandria is quite focused on measuring the impacts of pilot projects regarding solid particulate climate mitigation and urban biodiversity. What we see in common among all four cities or urban areas is the focus on climate change adaptation especially in relation to heat regulation, air quality and high precipitation events. What is more, all project partners are heavily focused on including the public in green infrastructure planning and in maintaining a high level of public involvement in the future.

The main internal and external supporters have included consultants, NGOs, political and local administrators, climate protection managers, green and city urban planning departments as well as the scientific project partners (e.g. IETU, IOER, IURS), external experts and last but not least local residents. It has been repeated many times how important the public has been in selection of sites for UEA, deciding on nature-based solutions (NbS) and the importance of the public in pilot project implementation. Unsurprisingly, the public has been involved within the four cities or urban areas from the onset of the planning process in various formats including Living Labs, GIS map applications, presentations, during online meetings and during research walks. These various formats have helped to improve the action planning process. In addition to data collected from residents, population, cadastral, land use and climate change data as well as information collected on-site regarding soil, percentage of sealed area, shade and temperature information has contributed to the selection of UEA sites. The McKinsey Matrix (Deliverable D.T1.1.1) recommended by SIGB guided project partners in narrowing down the sites based on necessity and suitability of sites.

To ensure that all of the efforts have paid off and as detailed in the national action planning concept controlling and monitoring plans activities have been carried out in each of the four cities or urban areas. Alessandra for example has created and will implement a number of indicators measuring temperature, biodiversity, education experiences and impact of green sites on learning capacity. The Impulse Region emphasizes receiving information regarding controlling and monitoring from different levels such as the public, internal and external stakeholders and city residents. Liptovský Mikuláš have based their monitoring and controlling recommendations on already existing documents and regulations within their or urban area. The maintenance plan appears also to be related to the monitoring of the impact of vegetation and soils. And also recommended the creation of specific types of reports for example Wood plants maintenance document, Regional Territorial system of Ecological Stability or a Climate Change Adaptation Strategy. Chorzów has identified specific aspects to be monitored including vitality of green areas, visual



appeal and usefulness of urban furniture, safety, accessibility for different population sectors and biodiversity.

Overall the practitioners within the pilot project cities or urban areas are optimistic concerning UEA and see potential in utilizing the concept for future green infrastructure planning. The knowledge gained from the project is seen as useful in conducting more targeted UEA in the future. Pilot projects also fit well with the current objectives within the urban areas and are predicted to contribute to climate change adaptation. Further integration of UEA into planning structures is desirable as it contributes toward public engagement as well as meeting local, global, and European environmental and social challenges.

## 6.2. Detailed suggestions to improve the planning process based on SALUTE4CE pilot project experience

The first step in improving the planning process for UEA is to **convince decision-makers** that such investments are important and necessary. In other words, advocates for UEA are important and can recommend the idea to decision makers. Scientific partners like those in the SALUTE4CE project may be helpful in the early stages of planning for urban green space as scientific mentoring can play a key role in solidifying policy and implementation strategies.

Public acceptance of UEA can be improved by **including residents** throughout the planning process (site and solution selection, implementation, maintenance). However, it should be kept in mind that including the public in the planning process takes more time than simply designing and implementing projects. Nonetheless the extra effort and time is worth it, as projects implemented without consultation with the public may face opposition in the long run. As witnessed within the SALUTE4CE project, the interest and engagement of the public in the UEA projects was unprecedented. This was useful in garnering further political support. It is expected that long-term benefits of the investments become visible to the residents resulting potentially in increased interest and openness to planning urban greenspace. Furthermore, citizens involved from the beginning of the planning process can feel a sense of ownership and responsibility for the sites. Citizen involvement is not only important for reasons of acceptance but also as a means of maintaining a low budget. Due to the small size of typically UEA sites volunteers are able with minimal time commitments to maintain the sites. Thoughtful design of UEA sites by technical managers such as usage of native plant species needing little upkeep can reduce the effort needed to maintain sites. Various sectors of the community can be brought together while implementing UEA projects. For example, school children and other non-profit organizations can aid in UEA site planning. Community competitions such as selecting a new name for a UEA site can also bring excitement to UEA implementation.

One of the appealing aspects regarding UEA is the **low-cost of the projects**. Undoubtedly, the small size of UEA sites play an important role in keeping the cost of site creation low. What is more, due to the small size and often ownership by cities obtaining sites is relatively easy. A few aspects are important to consider if the maintaining a low budget is important. In addition to voluntary labor in implementation and maintenance, equipment such as benches or insect hotels can be obtained via donations. Another appealing aspect regarding UEA is the **possibility of swift implementation** of green space. Here a few aspects should be considered. Vacant or underutilized sites requiring little preparation (i.e. removal of debris, etc.) can be quickly transformed by simple measures like creation of an insect friendly meadow in comparison to sites needing to be cleared where benches and playground equipment are to be installed. Both the cost and the time needed will increase.

Much was accomplished because of the SALUTE4CE project and can be further built upon in the future. Accomplishments of the project include creation of decision-making tools regarding site selection and the



types of NbS suitability. Within pilot project countries the *identification of further sites for future UEA* transformation has taken place. It has been confirmed within all four pilot projects that further development of small green sites is possible. Thus, the green networks can be further expanded in the future. Of course, cities outside the project partner cities are encouraged to implement UEA and to use the experiences of the pilot projects and lessons learned here to implement their own UEA action planning activities. Within the Central European countries in the SALUTE4CE project the availability of many small vacant lots could be confirmed and attributed to for example, past urban development patterns and demographic changes.

The action planning process has poised pilot project cities to *continue with UEA implementation*. For example, letters of commitment have been signed by city representatives and action plans provide a framework on how to continue with the expanding urban green within dense city districts. What is more, the project has been successful in raising awareness and in some cases resulted in unprecedented interest from the community which was able to influence public policy regarding green space development. Furthermore, many communities and city administrations now have the goal to further expand their urban green networks utilizing UEA. Areas for future improvement and integration of small scale green space development within political and planning procedures. As well as continuous updates to planning documents such as the list of potential UEA.

## Chapter 7 - Conclusions and Outlook

This guideline has provided an overview on the development and implementation of action plans for integrated environmental management in cities specifically the application of Urban Environmental Acupuncture (UEA). We have provided a detailed overview of the action planning concept as it was implemented within the SALUTE4CE project. In addition, chapters 4 and 5 provided an in-depth look into public participation and living labs as well as identification of green deficit areas, selection of UEA sites and NbS types. In chapter 6 we provided an overview of action planning with the four SALUTE4CE cities or urban areas (i.e. pilot project countries) as well as detailed suggestions on how to improve the planning process based on pilot project experience in Central European cities (Poland, Germany, Italy, Slovakia).

The nature of small urban spaces and their potential for significant positive impacts on a larger scale is certainly appealing in addressing concerns of the European commission. The EU biodiversity strategy has called for “enterprising and incentivizing” green infrastructure in order to increase biodiversity via action from citizens, businesses, social partners and the research and the knowledge community, as well as strong partnerships between local, regional, national and European level (European Commission 2020). The EU commission encourages corridors to prevent genetic isolation, allow for species migration, and maintain and enhance healthy ecosystems. Investments in green and blue infrastructure and cooperation across borders among Member States should be promoted and supported (European Commission 2020). It has recently acknowledged the importance of green urban spaces for physical and mental wellbeing in times of pandemics (e.g. COVID-19) (European Commission 2020). And further emphasizes the promotion of healthy ecosystems, green infrastructure and nature-based solutions which are systematically integrated into urban planning, including in public spaces, infrastructure, and the design of buildings and their surroundings (European Commission 2020). Previous communications from the EU Commission specifically the EU strategy on Green Infrastructure have emphasized the need to mitigate the urban heat island effect, create innovative methods to integrate green infrastructure, improve the knowledge base concerning benefits of ecosystem services and increase the number of skilled individuals to implement green infrastructure (European Commission 2013). UEA certainly addresses many of the concerns mentioned here that need to be addressed within the EU and beyond.

Based on our experiences in the SALUTE4CE project we have come to certain conclusions resulting action planning for UEA. Namely, UEA action planning can be seen as an informal planning process which is



complementary to other forms of planning i.e. it does not replace other types of planning. The small scale green sites are suitable for intensive public participation and input which can and should influence the action planning process (i.e. design, implementation and maintenance). UEA can be used to awaken interest in green infrastructure whether it be among residents, city administrations, practitioners or school children. The concept also addresses the challenge of how to include the public and other stakeholders in NbS implementation. Finally, the concept is future oriented whether considering the theoretical underpinnings or UEA's impact after implementation i.e. in creating momentum for further expansion of green infrastructure networks.

**\*Tip: Future perspectives for UEA sites\***

“To bring nature back to cities and reward community action, the [European] Commission calls on European cities of at least 20,000 inhabitants to develop ambitious Urban Greening Plans by the end of 2021. These should include measures to create biodiverse and accessible urban forests, parks and gardens; urban farms; green roofs and walls; tree-lined streets; urban meadows; and urban hedges. They should also help improve connections between green spaces, eliminate the use of pesticides, limit excessive mowing of urban green spaces and other biodiversity harmful practices. Such plans could mobilise policy, regulatory and financial tools. To facilitate this work, the Commission will in 2021 set up an EU Urban Greening Platform, under a new ‘Green City Accord’ with cities and mayors”

(European Commission 2020)



## References

- Apostolou, Malvina. 2015. "Urban Eco-Acupuncture Methods: Case Study in the City of Athens." 932-40. Porto, Heli, Greece: HAL archives-ouvertes. <https://halshs.archives-ouvertes.fr/halshs-01798506>.
- Arnstein, S.R. (1969). A Ladder of citizen participation. *Journal of the American Institute of Planners* 35, pp.216-224. <https://doi.org/10.1080/01944366908977225>.
- Bachmann, C. (Impulsregion Erfurt, Jena, Weimar, Weimarer Land) (2021): Personal messages
- Cain, N.L., Nelson, H.T. (2013). What drives opposition to high-voltage transmission lines? *Land Use Policy* 33, 204-213. <https://doi.org/10.1016/j.landusepol.2013.01.003>.
- Calderon, C., Butler, A. (2019). Politicising the landscape: a theoretical contribution towards the development of participation in landscape planning. *Landscape Research* 0, 1-12. <https://doi.org/10.1080/01426397.2019.1594739>.
- City of Dresden. 2022. "Fonds Stadtgruen." City of Dresden. January 19, 2022. <https://www.dresden.de/de/stadtraum/umwelt/gruenes-dresden/buerger/fonds-stadtgruen.php>.
- City of Vancouver. 2012. "Greenest City Action Plan 2020." City plan. Vancouver, Canada: City of Vancouver. <https://vancouver.ca/files/cov/Greenest-city-action-plan.pdf>.
- Coombes, M. A.; Viles, H. A. (2021): Integrating nature-based solutions and the conservation of urban built heritage: Challenges, opportunities, and prospects. *Urban Forestry & Urban Greening* 63, 127192. Elsevier GmbH.
- Coyle, Stephen. 2011. *Sustainable and Resilient Communities: A Comprehensive Action Plan for Towns, Cities, and Regions*. Wiley. USA and Canada.
- Drazkiewicz, A., Challies, E., Newig, J. (2015). Public participation and local environmental planning: Testing factors influencing decision quality and implementation in four case studies from Germany. *Land Use Policy* 46, pp. 211-222. <https://doi.org/10.1016/j.landusepol.2015.02.010>.
- EC (European Commission) (2021): Evaluating the impact of nature-based solutions. A Handbook for Practitioners. Research and Innovation Independent Expert Report. Luxembourg: Publications Office of the European Union.
- Elkjær, Laurits. 2010. "Third Generation City." Laurits Elkjær - Marco Casagrande: Urban Acupuncture (blog). May 5, 2010. <http://casagrandetext.blogspot.com/2010/04/laurits-elkjr-marco-casagrande-urban.html>.
- Elling, B., Nielsen, H.N. (2017). The misleading of public participation in environmental assessment - exploring four infrastructure cases in Denmark. *Journal of Environmental Policy & Planning* 0, 1-16. <https://doi.org/10.1080/1523908X.2017.1381591>.
- European Commission. 2013. "Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of Regions: Green Infrastructure (GI) Enriching Europe's Natural Capital." Communication COM/2013/0249final\*/. European Commission. <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52013DC0249>.
- European Commission. 2020. "EU Biodiversity Strategy for 2030: Bringing Nature Back into Our Lives." Communication from the commission to the European parliament, the council, the European economic and social committee and the committee of the regions Document 52020DC0380. Brussels: European Commission. <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52020DC0380>.





Furia, F., Ranzenigo, A.A., Abate, J.M., and Zicari, G. 2021. Action Plan for the City/FUA of Alessandria based on Urban Environmental Acupuncture. Deliverable D.T2.2.3. Interreg CENTRAL EUROPE program, sponsored by ERDF, grant number CE1472 SALUTE4CE.

GreenKeys Team, Alexandra Alexandropoulou, Berit Edlich, Carlos Smaniotto Costa, Dániel Horváth, Hans Kasperidus, Ina Suklje-Erjavec, et al. 2008. "Greenkeys @ Your City: A Guide for Urban Green Quality." Guide Book. Dresden: Leibniz Institute of Ecological and Regional Development. <http://www.greenkeys.org/manual.html>.

Haccou, Huibert, Tjeerd Deelstra, Jain Arun, Volkmar Pamer, Karolina Krosnicka, and Rob De Waard. 2007. "MILU: Multifunctional and Intensive Land Use: Principles, Practices, Projects and Policies." Scientific Report 978-90-806647-4-6. The Netherlands: The Habiforum Foundation.

Healey, Patsy. 2020. Collaborative Planning: Shaping Places in Fragmented Societies. Basingstoke/NewYork: Bloomsbury Publishing.

Hemingway, J.; Mathey, J.; Wirth, P. (2020): The transnational concept for action plans (Scientific Report). Dresden: IÖR.

Hemingway, Jessica, Juliane Mathey, and Peter Wirth. 2019. "Urbane Akupunktur Ein Ansatz zur städtischen Grünentwicklung?" *Transitioning Cities, Städtisches Grün - städtisches Blau*, no. 3: 76-78.

Hurlbert, M., Gupta, J. (2015). The split ladder of participation: A diagnostic, strategic, and evaluation tool to assess when participation is necessary. *Environmental Science & Policy* 50, pp. 100-113. <https://doi.org/10.1016/j.envsci.2015.01.011>.

Innes, J.E., Booher, D.E. (2004). Reframing public participation: strategies for the 21st century. *Planning Theory and Practice* 5, pp. 419-436. <https://doi.org/10.1080/1464935042000293170>.

Jami, A.A.N., Walsh, P.R. (2014). The role of public participation in identifying stakeholder synergies in wind power project development: The case study of Ontario, Canada. *Renewable Energy* 68, pp. 194-202. <https://doi.org/10.1016/j.renene.2014.02.004>.

Lerner, Jaime. 2003. *Acupuntura urbana*. Rio de Janeiro São Paulo: Ed. Record.

Lumat Team. 2016. "Lumat Project Booklet: Implementation of Sustainable Land Use in Integrated Environmental Management of Functional Urban Areas," May. <https://www.interreg-central.eu/Content.Node/LUMAT/Final-Booklet.pdf>.

Michener, V.J. (1998). The participatory approach: Contradiction and co-option in Burkina Faso 26, pp. 2105-2118. [https://doi.org/10.1016/S0305-750X\(98\)00112-0](https://doi.org/10.1016/S0305-750X(98)00112-0).

Nanz, P., Fritsche, M. (2012). *Handbuch Bürgerbeteiligung. Verfahren und Akteure, Chancen und Grenzen* [Handbook of Public Participation. Process and actors, chances and limits]. Bundeszentrale für Politische Bildung Available online: URL <https://www.bpb.de/shop/buecher/schriftenreihe/76038/handbuch-buergerbeteiligung> (accessed 22. Februar 2021).

Pallot, M., Trousse, B., Senach, B., Scapin, D. (2010). Living lab research landscape: From user centred design and user experience towards user cocreation. First European Summer School 'Living Labs.'

Reed, M.S. (2008). Stakeholder participation for environmental management: A literature review. *Biological Conservation* 141: 2417-2431. <https://doi.org/10.1016/j.biocon.2008.07.014>.

Rogga, S., Zscheischler, J., Gaasch, N. (2018). How Much of the Real-World Laboratory Is Hidden in Current Transdisciplinary Research? *GAIA* 27/S1(2018): 18 - 22.



SALUTE4CE. 2019. "Interreg Central Europe Application Form, SALUTE4CE Version 2." CE1472.

Schäpke, N., Stelzer, F., Caniglia, G. Bergmann, M., Wanner, M, Singer-Brodowski, M., Loorbach, D., Olsson, P., Baedeker, C., Lang, D.J. (2018). Jointly Experimenting for Transformation? Shaping Real-World Laboratories by Comparing Them. *GAIA* 27/S1(2018): 85 - 96.

Selle, Klaus. 1997. "Planung und Kommunikation." *DisP - The Planning Review* 33 (129): 40-47. <https://doi.org/10.1080/02513625.1997.10556645>.

SiBG (Silesian Botanical Garden); Trzaski, Leszek; Galej-Ciwiś, Katarzyna (SiBG) (2020): Transnational concept of local trainings on urban environmental acupuncture (UEA) (D.T1.3.1) and training materials in national languages (D.T1.3.2). Training materials for UEA in of the SALUTE4CE project.

Vojvodíková, B. (Ed.) (2022): SALUTE4CE - Handbook on Urban Environmental Acupuncture. Publisher: VŠB – Technical University of Ostrava, Faculty of Civil Engineering, Ostrava 2022. ISBN 978-80-248-4598-2.

Weymouth, R., Hartz-Karp, J. (2019). Participation in planning and governance: closing the gap between satisfaction and expectation. *Sustainable Earth*: 1-15. <https://doi.org/10.1186/s42055-019-0012-y>.



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## List of Abbreviations

EU - European Union

ESS - Ecosystem Services

GBI - Green Blue Infrastructure

GI - Green Infrastructure

NbS - Nature Based Solutions

UEA - Urban Environmental Acupuncture

UN - United Nations



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- Fig. 10:** McKinsey matrix for the assessment of NbS types under aspects of use at the acupuncture site; example of five NbS types for the example area “Spielbergtor” in Erfurt (Germany). Suitability for upgrading: 9 categories; maximum total score:  $18 = 9 \cdot 2 \cdot 1$  (if all weights 1),  $36 = 9 \cdot 2 \cdot 2$  (if all weights 2); Benefits: 7 categories; maximum total score:  $35 = 7 \cdot 5 \cdot 1$  (if all weights 1),  $70 = 7 \cdot 5 \cdot 2$  (if all weights 2). NbS types: NbS A: wildflower meadow; NbS B: border strips/flower beds with native perennials; NbS C: large shrubs; NbS D: fruit trees/fruit bushes; NbS E: green pergolas/green arbours.
- Fig. 11:** Overview map of the boundary of green deficit areas in Erfurt (Germany) including potential acupuncture sites and selected sites: Körnerstraße, Holbeinstraße and Spielbergtor. Source: Bachmann (2021).



## Annexes - Tables

- Table 2.1:** Analysis sheet for the identification of green deficit areas for the action plan using the example of Erfurt (Germany). Source of characterisation: C. Bachmann (2021).
- Tab. 2.2:** Analysis sheet to determine the need for action and suitability using the example of Erfurt (Germany). Source of diagnosis: Bachmann (2021).
- Tab. 3.1:** Analysis sheet for the evaluation of the obligatory criteria using the example of Erfurt (Germany). Source of assessment: Bachmann (2021).
- Tab. 3.2:** Analysis sheet for the evaluation of potential acupuncture sites according to the need for action using the example of two locations in Erfurt (Germany): Site 1: Körnerstraße, Site 2: Holbeinstraße. Source of assessment: Bachmann (2021).
- Tab. 3.3:** Analysis sheet for the evaluation of potential acupuncture sites according to suitability using the example of two locations in Erfurt (Germany): Location 1: Körnerstraße, Location 2: Holbeinstraße. Source of assessment: Bachmann (2021).
- Tab. 3.4:** Analysis sheet for suitability and need for action using the example of two locations in Erfurt (Germany): Site 1: Körnerstraße (St 1), Site 2: Holbeinstraße (St 2).
- Tab. 4.1:** Analysis sheet for the assessment of NbS types according to obligatory criteria using the example of five NbS types for the example area "Spielbergtor" in Erfurt (Germany). Source of assessment: Participants of Erfurt excursion on 14th September 2021.
- Tab. 4.2:** Analysis sheet for the assessment of NbS types with regard to their suitability for upgrading using the example of five NbS types for the example site "Spielbergtor" in Erfurt (Germany). Source of assessment: Participants of Erfurt excursion on 14th September 2021.
- Tab. 4.3:** Analysis sheet for the assessment of NbS types under aspects of use at the acupuncture site using the example of five NbS types for the example area "Spielbergtor" in Erfurt (Germany). Source of assessment: Participants of Erfurt excursion on 14th September 2021.
- Tab. 4.4:** Analysis sheet for suitability and benefit using the example of five NbS types for the example area "Spielbergtor" in Erfurt (Germany).





## Annex 1: Example of an action plan outline\*

### “Action Plan for the City of [...] based on Urban Environmental Acupuncture”

1. Introduction
  - 1.1 Concept of the Action Plan in the context of SALUTE4CE project
  - 1.2 Objectives of the Action Plan
2. Creation of an Action Plan for the City
  - 2.1 Challenges (initial situation)
  - 2.2 Visions and aims of the City
  - 2.3 Involvement of stakeholders and inhabitants
  - 2.4 Work program and schedule
3. Urban Environmental Acupuncture sites in the City
  - 3.1 Selection of UEA sites
    - 3.1.1 Site analyses
      - i. General information (demography, planning framework etc.)
      - ii. Physical information (morphology, hydrology etc.)
    - 3.1.2 Preselection and assessment of sites (using the WP1 assessment matrix)
    - 3.1.3 Specification of implementation sites
  - 3.2 Planning single actions
    - 3.2.1 Identification of measures and approaches
    - 3.2.2 Living lab discussion (public feedback)
    - 3.2.3 Specification of measures and approaches
  - 3.3 Recommendations
    - 3.3.1 Management and maintenance planning (incl. responsibilities and financing)
    - 3.3.2 Controlling (Monitoring)
    - 3.3.3 Outlook and future prospects
4. Summary (in English language; 5-10 pages, with the same outline as shown above)

\* Based on an idea by Christian Bachmann/Impulse Region.



**Annex 2: Analysis sheets for Section 5.1: Identification of urban green deficit areas for the action plan using the example of Erfurt (Germany)**  
 (after material from SiBG - Silesian Botanical Garden 2020)

**Annex 2-1: Characterization of green deficit areas using the example of Erfurt (Germany)**

→ Please use the template below (Tab. 2.1) to characterise the green deficit area.

Table 2.1: Analysis sheet for the identification of green deficit areas for the action plan using the example of Erfurt (Germany). Source of characterisation: C. Bachmann (2021)

| Working title of the Area  | Site Characteristics (text description)   | Boundary of the area (e.g. map) |
|--|---|---------------------------------|
| <b>Green deficit area Erfurt according to the Impulse Region action plan (July 2021)</b> | Erfurt is the capital of the Free State of Thuringia (Germany). With around 214,000 inhabitants, it is the largest city in Thuringia (269.2 km <sup>2</sup> ), located on the southern edge of the Thuringian Basin, in the wide valley of the Gera River. In the south, the city area is bordered by the forested heights of the Steigerwald. The average annual rainfall is about 500 mm, making Erfurt one of the driest major cities in Germany. The city does not have a particularly developed suburban belt and is not located in a metropolitan area. Due to the different historical and economic development of the individual districts, social disparities exist. Due to the dense development, the local recreation areas are almost exclusively located on the outskirts of the city, e.g. Steigerwald, Nordstrand or ega-Park. | See annex 7!                    |



## Annex 2-2: Identification of the need for action and suitability using the example of Erfurt (Germany) (Reasons for implementing the action plan in this area)

- Using all available information, assess the area in terms of need for action and suitability and derive your decision from this (Tab. 2.2). Do enough reasons speak for the implementation of the action plan, i.e. for the implementation of UEA in this area (suitable data see section 2.2.1)

Tab. 2.2: Analysis sheet to determine the need for action and suitability using the example of Erfurt (Germany). Source of diagnosis: Bachmann 2021)

|                                  | Reasons (Are there any?)  | Diagnosis ( <i>short description in 1-2 sentences</i> )   |
|----------------------------------|---|---|
| Reasons for high need for action | Deficit of public green spaces  | Due to the dense building development in the city centre, there are no large green areas there.   |
|                                  | Insufficient access to public green spaces  | Good access to public green spaces does not exist in all urban areas. Therefore, an important aim is the creation of a publicly accessible and interconnected open space system consisting of pathways, parks, squares and avenues, also between the core city and the districts.             |
|                                  | Existence of small previously neglected areas                                       | In the planning of recent years, some larger green spaces have been redesigned in the course of the Federal Garden Show 2021, among others. Small targeted measures are intended to increase biodiversity, improve adaptation to climate change and promote the quality of life of residents. |
| Reasons for high suitability     | No planning restrictions that exclude the development of green spaces               | Various concepts and plans, such as the integrated urban development concept 2030, the landscape plan or the action concept for climate protection of Erfurt offer solutions for the development of green spaces.   |
|                                  | No technical restrictions that exclude the development of small green spaces        | The city of Erfurt has a lot of green spaces without technical restrictions. Areas where there are no technical restrictions offer a wide range of possibilities for the redesign of green spaces. Here, many ideas can be developed by citizens in consultation with planners.               |
|                                  | No property-related restrictions that exclude the implementation of the action plan | The selection of new potential development sites in the course of the green environmental acupuncture has focused on sites that are owned by the city.  |

### Annex 3: Analysis sheets for Section 5.2: Evaluation of potential acupuncture sites (after material from SiBG - Silesian Botanical Garden 2020)

#### Annex 3-1: Analysis of sites according to obligatory criteria using the example of Erfurt (Germany)

Analysis based on obligatory criteria that must be met in full for a site to be considered in the further evaluation.

The analysis is carried out here as an example for three sites in Erfurt (Germany): Site 1: Körnerstraße (Fig. 1, Fig. 2), Site 2: Holbeinstraße (Fig. 3, Fig. 4) and Site 3: Thälmannstraße.



Fig. 1: Impression on Site 1 "Körnerstraße", Erfurt.  
Photo: J. Hemingway.



Fig. 2: Impressions on Site 1 "Körnerstraße", Erfurt.  
Photo top: J. Mathey, Photo bottom:  
C. Bachmann.



Fig. 3: Impression on Site 2 "Holbeinstraße", Erfurt.  
Photo: J. Mathey.



Fig. 4: Impression on Site 2 "Holbeinstraße", Erfurt.  
Photo: J. Hemingway



- ➔ Please use the template below (Tab. 3.1) to document the fulfilment/non-fulfilment of the obligatory criteria of individual, pre-selected acupuncture sites. If the site meets a certain criterion, please put a "+", if not, a "-".
- ➔ If a "-" appears for even one criterion for a certain area, it means that this area will not be considered in further analysis.

Tab. 3.1: Analysis sheet for the evaluation of the obligatory criteria using the example of Erfurt (Germany). Source of assessment: Bachmann (2021)

| Required Condition   | Site 1 | Site 2 | Site 3 | ... |
|--|--------|--------|--------|-----|
| Availability of the area   | +      | +      | -      |     |
| Need to transform the site   | +      | +      | +      |     |
| Clear legal status and clarity on the permitting process                         | +      | +      | -      |     |
| Compatibility with existing/planned infrastructure                               | +      | +      | -      |     |
| Conformance with applicable plans, programs, or projects designated for the area | +      | +      | +      |     |
| No conflicts with local interest groups  | +      | +      | +      |     |
| Result/Conclusion: "Yes" or "No"   | Yes    | Yes    | No     |     |

Evaluation: Site 1: Körnerstraße (Fig. 1, Fig. 2) and Site 2: Holbeinstraße (Fig. 3, Fig. 4) are both suitable potential acupuncture sites. Site 3: Thälmannstraße does not-fulfil all mandatory criteria and therefore should not be considered as an acupuncture site.



### Annex 3-2: Assessment of potential acupuncture sites according to the need for action

→ Using the table below (Tab. 3.2), please conduct a comparative assessment of the need for action in terms of conversion to green space for several potential acupuncture sites.

**Rating:** 2 = major benefit; 1 = moderate benefit; 0 = negligible benefit or no benefit in terms of the need for action.

If needed, weighting can be applied and should be entered in column 2.

Tab. 3.2: Analysis sheet for the evaluation of potential acupuncture sites according to the need for action using the example of two locations in Erfurt (Germany): Site 1: Körnerstraße, Site 2: Holbeinstraße. Source of assessment: Bachmann (2021)

| Category (Service/Benefit)                 | Weight Factor (1 / 2) | Type of Service/Benefit   | Evaluation of the Benefits by UEA (0; 1; 2) |        |       |
|--|-----------------------|---|---|--------|-------|
|  |                       |   | Site 1                                      | Site 2 | ..... |
| Social Aspects<br>for the Local Population | 1                     | Creation of "neighbourhood spaces" for recreation and socializing.  | 2   | 1      |       |
|  | 1                     | Creation of a positive identity of the site and its surroundings  | 2   | 0      |       |
|  | 1                     | Increasing the visual attractiveness of the site  | 2   | 2      |       |
|  | 1                     | Improvement of the feeling of being safe  | 2   | 0      |       |
| Environmental Quality                      | 1                     | Improving the accessibility of the green space especially for sensitive groups (e.g. elderly people, parents with children, disabled people)      | 1   | 0      |       |
|  | 1                     | Improvement of the quality of stay/usability of the site by increasing the amount of greenery   | 2   | 1      |       |
|  | 1                     | Improvement of the usability of the site through more greenery and special attractions (e.g. playground equipment, chess field, sports equipment) | 2   | 1      |       |
|  | 1                     | Improvement of the microclimate (e.g. reduction of the exposure of people to heat)  | 2   | 1      |       |



| Category (Service/ Benefit)            | Weight Factor (1 / 2) | Type of Service/Benefit  | Evaluation of the Benefits by UEA (0; 1; 2) |        |       |
|--|-----------------------|--|---|--------|-------|
|  |                       |  | Site 1                                      | Site 2 | ..... |
| Ecological Quality                     | 1                     | Spatial-functional linkage with already existing or planned blue or green spaces.  | 0   | 0      |       |
|  | 1                     | Increase urban biodiversity (e.g., use native plant species, eliminate invasive plant species).                          | 2   | 2      |       |
|  | 1                     | Provide food sources for wildlife (e.g., small animals, butterflies, other pollinators, birds).                          | 2   | 1      |       |
| Area Circular Economy                  | 1                     | Enabling the reuse of urban brownfields by the local community.  | 0   | 0      |       |
|  | 1                     | Improving storm water management (e.g., local use of surplus storm water, infiltration into the ground, local retention) | 0   | 0      |       |
| Function Diversity of the Public Space | 1                     | Enrichment of the site with new functions  | 2   | 1      |       |
|  | 1                     | Improving the connectivity of different types of public spaces   | 1   | 0      |       |
|  |                       | Total Score (max. 30)  | 22  | 10     |       |

**Evaluation of need for action:** 15 categories; maximum total score: 30 = 15\*2\*1 (if all weights 1), 60 = 15\*2\*2 (if all weights 2).

The higher the score, the higher the need for action for the respective site to be changed into an acupuncture site.



### Annex 3-3: Evaluation of potential acupuncture sites in terms of suitability for upgrading

→ Using the table below (Tab. 3.3), please conduct a comparative assessment of the suitability for upgrading in terms of urban environmental acupuncture for several potential acupuncture sites.

**Rating:** 2 = fully applies, 1 = conditionally applies, 0 = does not apply.

If needed, weighting can be applied and should be entered in column 2.

Tab. 3.3: Analysis sheet for the evaluation of potential acupuncture sites according to suitability using the example of two locations in Erfurt (Germany): Location 1: Körnerstraße, Location 2: Holbeinstraße. Source of assessment: Bachmann (2021)

| Category (Suitability)           | Weight Factor (1 / 2) | favourable/unfavourable Conditions   | Individual Scores (0; 1; 2) |        |       |
|----------------------------------|-----------------------|--|-----------------------------|--------|-------|
|                                  |                       |  | Site 1                      | Site 2 | ..... |
| Technical Conditions             | 1                     | Little/no difficulties arising from specifics of the site that increase workload and costs for maintenance, cleaning, and quick repairs                                      | 1                           | 1      |       |
|                                  | 1                     | Little/no expected burden/time required to obtain necessary permits (building, environmental, and conservation permits) for implementation at the site                       | 1                           | 1      |       |
|                                  | 1                     | Little/no cost or time-consuming preparatory work required   | 0                           | 1      |       |
|                                  | 1                     | Possibility of creating solutions that combine greening with the management of excess rainwater or its infiltration into the ground  | 1                           | 0      |       |
| Spatial Connections/<br>Linkages | 1                     | Little/no expected constraints due to proximity to neighbouring uses (e.g. shopping centres, industrial centres, administrative centres, logistics centres, infrastructures) | 1                           | 1      |       |
|                                  | 1                     | Expected functional/spatial links/connections with neighbouring facilities (e.g. residential areas, sports centres, cultural and educational facilities)                     | 2                           | 1      |       |





| Category (Suitability)      | Weight Factor (1 / 2) | favourable/unfavourable Conditions  | Individual Scores (0; 1; 2) |        |       |
|-----------------------------|-----------------------|---|-----------------------------|--------|-------|
|                             |                       |   | Site 1                      | Site 2 | ..... |
| Legal/Planning Requirements | 1                     | Little/no expected restrictions due to ownership (public, private).   | 2                           | 2      |       |
|                             | 1                     | Little/no potential obstacles/constraints to implementation arising from the current/planned expansion or reconstruction of urban infrastructure at the site. | 2                           | 1      |       |
|                             | 1                     | Little/no restrictions on implementation or use resulting from the need to protect existing cultural or natural values  | 2                           | 2      |       |
| Local Residents             | 1                     | Little/no threat of vandalism or anti-social behaviour, attractiveness of the site for criminals (compared to neighbouring areas).                            | 1                           | 1      |       |
|                             | 1                     | Confirmed acceptance by local population (little/no conflicts expected with owners/users of neighbouring properties).   | 2                           | 1      |       |
|                             | 1                     | Location which, despite the current lack of greenery, is preferred by owners/users of neighbouring properties for recreational activities                     | 2                           | 1      |       |
| Environmental Quality       | 1                     | Existing or expected accessibility constraints for older people, parents with children and/or disabled people.  | 1                           | 2      |       |
|                             | 1                     | Environmental conditions that limit people' ability/comfort to stay (poor air quality, noise pollution, risk of flooding, etc.)                               | 2                           | 1      |       |
|                             | 1                     | The implementation of the UEA will create the possibility to use the planned sites as green space for public space in the long term (many years)              | 2                           | 2      |       |
|                             |                       | Total Score   | 22                          | 18     |       |

**Evaluation of suitability for upgrading:** 15 categories; maximum total score: 30=15\*2\*1 (if all weights 1), 60=15\*2\*2 (if all weights 2).

The higher the score, the more suitable the respective site is for upgrading to an acupuncture site.



### Annex 3-4: Combined assessment of need for action and suitability of potential acupuncture sites using the McKinsey matrix

Each potential acupuncture site can be represented by a rating - as a point in the matrix area - in the green, yellow or red field. The use of a matrix can be particularly useful when there are a large number of sites to choose from.

#### Analysis steps:

- Enter the scores determined in Annex 2-2 and Annex 3-3 into the table below (Tab. 3.4).
- Graphically position the scores on need for action and suitability for individual sites as points on the McKinsey matrix (Fig. 5).
- From the matrix you can then read off the most suitable acupuncture sites.

Tab. 3.4: Analysis sheet for suitability and need for action using the example of two locations in Erfurt (Germany): Site 1: Körnerstraße (St 1), Site 2: Holbeinstraße (St 2)

|                           | Site 1 (St 1) | Site 2 (St 2) | Site ..... |
|---------------------------|---------------|---------------|------------|
| Suitability for Upgrading | 22            | 18            |            |
| Need for Action:          | 22            | 10            |            |

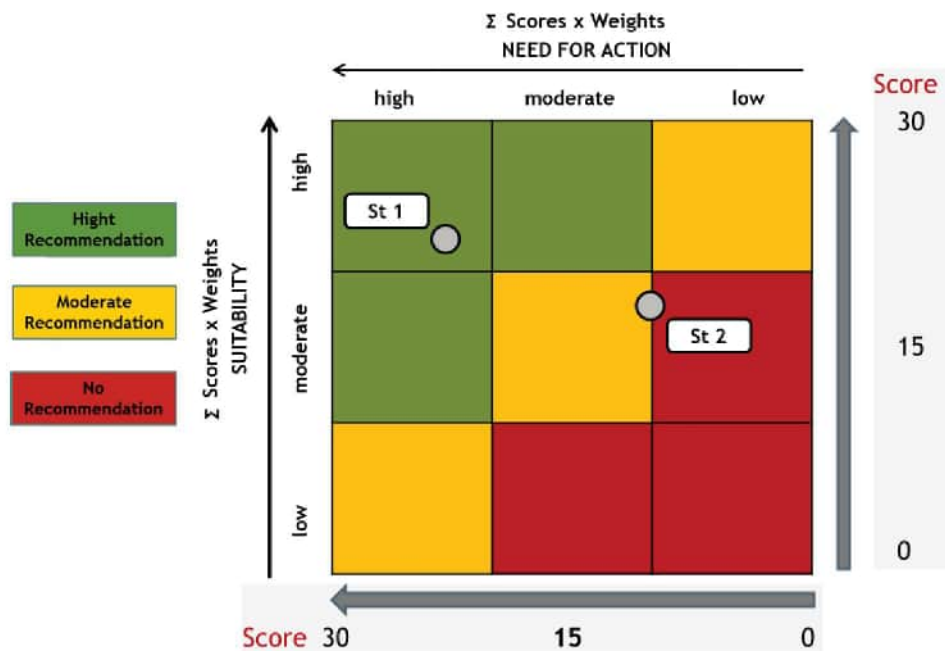


Fig. 5: McKinsey matrix for the selection of acupuncture sites: Maximum possible total score without weights for need for action and suitability 30 each; example for two sites in Erfurt (Germany); site 1: Körnerstraße (St 1), suitability 22 points, need for action 22 points), site 2: Holbeinstraße (St 2, suitability 18 points, need for action 10 points).

The evaluation shows that site 1: Körnerstraße (St 1), which is in the green zone in terms of both suitability and need for action, is very well suited as an acupuncture site. Site 2: Holbeinstraße (St 2) is in the yellow zone in terms of suitability and between the yellow and red zones in terms of need for action and is therefore moderately to poorly suitable as an acupuncture site.

#### Annex 4: Analysis sheets for Section 5.3: Selection of the intervention (NbS types) (after material from SiBG - Silesian Botanical Garden 2020)

The determination of the "needles", i.e. specific measures at the acupuncture sites, is also carried out in a multi-stage procedure in which nature-based solutions (NbS) are examined with regard to the fulfilment of obligatory criteria (Annex 4-1), their suitability as an intervention measure (Annex 4-2) and their benefit for the acupuncture site or for the goals of the action plan (Annex 4-3). Supported by information in Annexes 5 and 6, data already collected will be analysed for this purpose. Annex 5 describes suitable natural-based solutions for urban acupuncture. In order to assess the potential benefits of the respective nature-based solutions for the selected acupuncture sites, Annex 6 compiles selected potential ecosystem services (ESS) for the NbS types. The final selection of NbS types can also be supported by the McKinsey matrix (Annex 4-4).

The procedure is explained here using the example of the "Spielbergtor" area in Erfurt. It is an 990 m<sup>2</sup>-large, elongated lawn (132 m x 12 m) with a row of trees (Fig. 6, Fig. 7), which lies between a busy road and a row of houses (Fig. 8) with a car park (Fig. 9).



Fig. 6: Impression on Site 3 „Spielbergtor“, study area: meadow with a line of trees. Photo: J. Mathey.



Fig. 7: Impression on Site 3 „Spielbergtor“, study area behind bus. Photo: J. Mathey.



Fig. 8: Impression on Site 3 „Spielbergtor“, houseline vis-à-vis of study area. Photo: J. Mathey.



Fig. 9: Impression on Site 3 „Spielbergtor“, parking next to the study area. Photo: J. Mathey.

The following were selected as possible NbS types (intervention solutions) for site 3: NbS type A: Wildflower meadow; NbS type B: Border strips/flower beds with native perennials; NbS type C: Large shrubs; NbS type D: Fruit trees/fruit bushes; NbS type E: Green pergolas/green arbours and evaluated with regard to the fulfilment of obligatory criteria (Annex 4-1), their suitability as an intervention measure (Annex 4-2) and the benefit for the acupuncture site or for the objectives of the action plan (Annex 4-3).



The better the information about the site, the greater the chance of making a good decision, choosing a particular nature-based solution (NbS) and excluding other options.

| Name of the Site    | Coordinates                   |
|---------------------|-------------------------------|
| Site „Spielbergtor“ | 50° 58'19.3"N / 11° 02'28.9"E |

#### Annex 4-1: Analysis of NbS types according to obligatory criteria (NbS types: see Annex 4!)

Analysis of the obligatory criteria that must be fully met in order for an NbS type to be considered for further assessment.

- Please use the template below (Tab. 4.1) to document the fulfilment/non-fulfilment of the obligatory criteria of individual, pre-selected NBS types. If the NbS type fulfils a certain criterion, please put a "+", if not, a "-".

If a "-" appears for even one criterion for a certain NbS type, this means that this NbS type will no longer be considered in the further analysis.

Tab. 4.1: Analysis sheet for the assessment of NbS types according to obligatory criteria using the example of five NbS types for the example area "Spielbergtor" in Erfurt (Germany). Source of assessment: Participants of Erfurt excursion on 14<sup>th</sup> September 2021

| Preconditions  | NbS A      | NbS B      | NbS C      | NbS D      | NbS E      |
|--|------------|------------|------------|------------|------------|
| Clear procedural path/permit for this NbS type (green space type).   | +          | +          | +          | +          | +          |
| No irreversible conflicts of this NbS type (green space type) with underground or above ground facilities/infrastructure (neither existing nor planned). | +          | +          | +          | +          | +          |
| Sufficient space for this NbS type (green space type), both for the implementation and maintenance of the green space.                                   | +          | +          | +          | +          | +          |
| No conflict with the city's existing plans/programmes/projects.  | +          | +          | +          | +          | +          |
| No explicit conflicts with local stakeholders/citizen groups   | +          | +          | +          | +          | +          |
| <b>Conclusion: "Yes" or "No"</b>   | <b>Yes</b> | <b>Yes</b> | <b>Yes</b> | <b>Yes</b> | <b>Yes</b> |

Evaluation: All NbS types fulfil all obligatory criteria and therefore can be considered for further assessment: NbS type A: wildflower meadow, NbS type B: border strips/flower beds with native perennials, NbS type C: large shrubs, NbS type D: fruit trees/fruit bushes; NbS type E: green pergolas/green arbours



#### Annex 4-2: Evaluation of certain NbS types with regard to their suitability for upgrading.

→ Please use the table below (Tab 4.2) to make a comparative assessment of the suitability of the NbS type for UEA at site 3 "Spielbergtor".

**Score:** 2 = fully applies, 1 = partially applies, 0 = does not apply.

If necessary, a weight can be applied, which is to be entered in column 2.

Tab. 4.2: Analysis sheet for the assessment of NbS types with regard to their suitability for upgrading using the example of five NbS types for the example site "Spielbergtor" in Erfurt (Germany). Source of assessment: Participants of Erfurt excursion on 14<sup>th</sup> September 2021.

| Category Suitability                           | Weight Factor (1 / 2) | favourable/unfavourable Conditions   | Individual Scores (0; 1; 2) |       |       |       |       |
|--|-----------------------|--|-----------------------------|-------|-------|-------|-------|
|  |                       |  | NbS A                       | NbS B | NbS C | NbS D | NbS E |
| Technical/procedural aspects of implementation | 1                     | Little/no expected difficulties/high time requirements for agreements/approvals.   | 2                           | 2     | 2     | 0     | 1     |
|  | 1                     | Little/no potential conflicts of the NbS type with existing facilities that require additional effort  | 2                           | 2     | 1     | 0     | 0     |
| Financial Aspects of Implementation            | 1                     | Little/no additional costly or time-consuming preparatory work expected due to site conditions   | 2                           | 2     | 2     | 0     | 0     |
|  | 1                     | Little/no labour-intensive and/or cost-intensive maintenance to be expected due to site conditions   | 2                           | 1     | 1     | 0     | 0     |
| Technical/procedural aspects of maintenance    | 1                     | Clear responsibilities/obligations regarding the maintenance of the NBS type   | 2                           | 2     | 2     | 2     | 2     |
|  | 1                     | Existence of practical experience and qualified personnel who can implement this type of NBS   | 2                           | 2     | 2     | 2     | 2     |
| Financial Context                              | 1                     | Little/no expected difficulties in financing the NbS type (e.g. lack of funds in the municipal budget or difficulties in raising external funds) | 2                           | 2     | 2     | 2     | 1     |
| Compatibility and Acceptance                   | 1                     | Compatibility of the NbS type with the character of the acupuncture site/environment   | 2                           | 2     | 2     | 1     | 0     |
|  | 1                     | Expected acceptance of the local population for the NbS type   | 2                           | 2     | 2     | 0     | 0     |
|  |                       | Total Score  | 18                          | 17    | 16    | 7     | 6     |

**Evaluation of suitability for upgrading:** 9 categories; maximum total score: 18 = 9\*2\*1 (if all weights 1), 36 = 9\*2\*2 (if all weights 2). The most suitable NbS type(s) for upgrading is (are): NbS type A: wildflower meadow, NbS type B: border strips/flower beds with native perennials, NbS type C: large shrubs.



### Annex 4-3: Evaluation of potential NbS types under aspects of use at the acupuncture site

The question is: "Do the respective NbS types provide a benefit with regard to certain ecosystem services (ÖSL) (Annex 6)?"

- Please use the table below (Tab. 4.3) to make a comparative assessment of the benefits in terms of potential NBS types for the acupuncture site.

**Evaluation:** Possible scores for each ecosystem service are: 0; 1; 2; 3; 4; 5; where 5 = very large benefit; 0 = marginal benefit or no benefit.

If necessary, a weighting can be applied, which is to be entered in column 2.

Tab. 4.3: Analysis sheet for the assessment of NbS types under aspects of use at the acupuncture site using the example of five NbS types for the example area "Spielbergtor" in Erfurt (Germany). Source of assessment: Participants of Erfurt excursion on 14<sup>th</sup> September 2021

| Categories<br>Benefit<br>Eco System<br>Services | Weight<br>Factor<br>(1 / 2) | Examples for Benefits   | Individual Scores from<br>Services (0; 1; 2; 3; 4; 5) |          |          |          |          |
|---|-----------------------------|---|---|----------|----------|----------|----------|
|   |                             |   | NbS<br>A  | NbS<br>B | NbS<br>C | NbS<br>D | NbS<br>E |
| Microclimate<br>Air quality<br>Noise            | 1                           | Reducing human exposure to heat<br>Improving air quality<br>Reduction of noise  | 2   | 2        | 4        | 4        | 4        |
| Water<br>Balance                                | 1                           | Improving storm water management (e.g. local use of excess storm water, infiltration into the ground, local retention)<br>Linking green spaces with storm water infrastructure<br>De-sealing  | 1   | 1        | 3        | 3        | 2        |
| Green Space<br>Management                       | 1                           | Creation/protection of areas with low maintenance and relatively low maintenance costs, in which nature "runs wild" and species can spontaneously establish themselves<br>Promote heat and drought tolerant species/varieties<br>Support of a local NGO/citizen initiative for the conservation of green spaces | 5   | 4        | 3        | 1        | 2        |



| Categories<br>(Eco System<br>Services)<br>(Benefit) | Weight<br>Factor<br>(1 / 2) | Examples for Benefits  | Individual Scores from<br>Services (0; 1; 2; 3; 4; 5) |       |       |       |       |
|---|-----------------------------|--|---|-------|-------|-------|-------|
|   |                             |  | NbS A   | NbS B | NbS C | NbS D | NbS E |
| Biodiversity  | 1                           | Enhancing urban biodiversity (e.g. introducing native plant species, eliminating invasive plant species).<br>Providing food for wildlife (e.g. small animals, butterflies, other pollinators, birds)<br>Protection/enhancement of native biotopes, especially ecologically important/endangered ones<br>Strengthening urban soil protection/soil restoration | 5   | 5     | 5     | 5     | 3     |
| Quality of Stay                                     | 1                           | Increasing synergies between different functions, reducing conflicts.<br>Increasing safety when staying at a particular site<br>Increase/create visual attractiveness of the site<br>Increasing the multi-functionality of the public space at the site  | 3   | 3     | 4     | 3     | 4     |
| Integration of the Local Population/Community       | 1                           | Creation of "neighbourhood spaces" for leisure activities and socialising<br>Increasing the feeling of safety<br>Creating a positive identity of the site and its surroundings<br>Improving the attractiveness of the site for elderly people, parents with children, disabled people  | 2   | 2     | 2     | 2     | 3     |
| Functional Diversity of Public Spaces               | 1                           | Improving the functional network of different types of public spaces<br>Spatial-functional linkage with existing/planned green-blue infrastructure.<br>Increasing the quality of green-blue infrastructure at city level   | 2   | 2     | 3     | 3     | 3     |
| Total Score   |                             |  | 20  | 19    | 24    | 21    | 21    |

Evaluation of benefits: 7 categories; maximum total score: 35 = 7\*5\*1 (if all weights 1), 70 = 7\*5\*2 (if all weights 2). The following NbS type(s) are benefitting most on ecosystem services: NbS type C: large shrubs, NbS type D: fruit trees/fruit bushes, NbS type E: green pergolas/green arbours.



#### Annex 4-4: Combined assessment of the benefits and suitability of potential NbS types using the McKinsey matrix

Each potential NbS type can be reflected by a score - as a point in the McKinsey-Matrix area - in the green, yellow or red field (Fig. 10). The use of a matrix can be particularly useful when selecting from a large number of sites.

##### Analysis steps:

- Record the scores obtained in Annex 4-2 and Annex 4-3 in the table below (Tab. 4.4).
- Graphically position the benefit and suitability scores for individual sites as dots on the McKinsey-Matrix (Fig. 3.4).
- From the matrix you can then read off the most suitable NbS types.

Tab. 4.4: Analysis sheet for suitability and benefit using the example of five NbS types for the example area "Spielbergtor" in Erfurt (Germany)

|             | NbS-Typ A | NbS-Typ B | NbS-Typ C | NbS-Typ D | NbS-Typ E |
|-------------|-----------|-----------|-----------|-----------|-----------|
| Suitability | 18        | 17        | 16        | 7         | 6         |
| Benefit     | 20        | 19        | 24        | 21        | 21        |

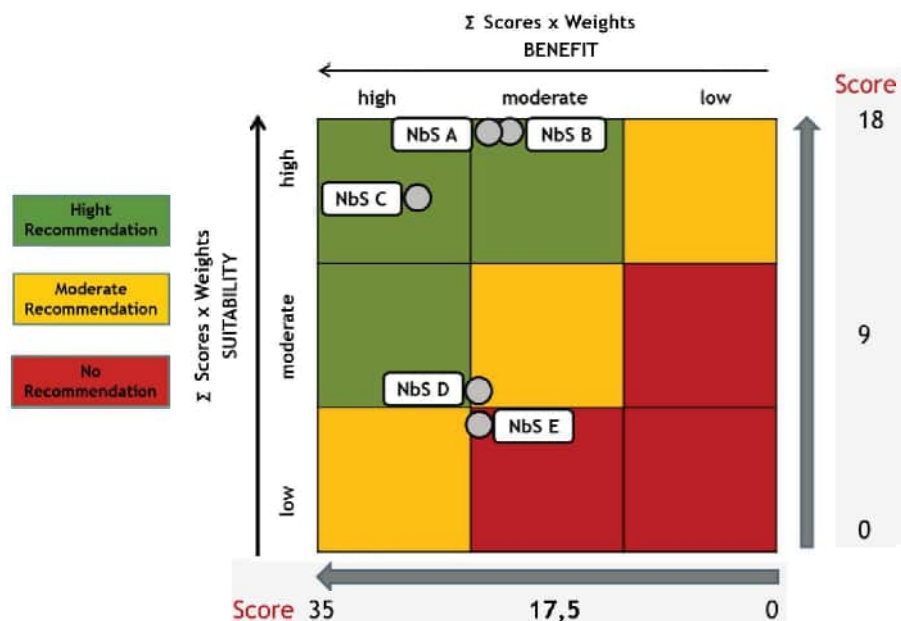


Fig. 10: McKinsey matrix for the assessment of NbS types under aspects of use at the acupuncture site; example of five NbS types for the example area "Spielbergtor" in Erfurt (Germany). Suitability for upgrading: 9 categories; maximum total score: 18 = 9\*2\*1 (if all weights 1), 36 = 9\*2\*2 (if all weights 2); Benefits: 7 categories; maximum total score: 35 = 7\*5\*1 (if all weights 1), 70 = 7\*5\*2 (if all weights 2). NbS types: NbS A: wildflower meadow; NbS B: border strips/flower beds with native perennials; NbS C: large shrubs; NbS D: fruit trees/fruit bushes; NbS E: green pergolas/green arbours.

Evaluation of NbS types: The most suitable nature-based solutions for this site are those in the green areas: NbS type A: wildflower meadow; NbS type B: border strips/flower beds with native perennials; NbS type C: large shrubs.





**Annex 5: Description of nature-based solutions (NbS) suitable for urban environmental acupuncture (after material from SiBG - Silesian Botanical Garden 2020)**

| Rooting     | NbS Name   | Definition  | Arrangement |
|-------------|--|---|-------------|
| Ground      | Urban Meadows  | Species-rich plant communities of native herbaceous plants in the form of mesotrophic (medium nutrient content) or dry meadows in urban areas   | horizontal  |
|             | Verges/Flower Beds with Native Perennials  | Roadside linear elements or plots (flowerbeds) of green spaces with reduced maintenance intensity sown with a wildflower-rich grass seed mixture to attract food-seeking insect pollinator species with nectar and pollen |             |
|             | Ground Cover Plants  | An area of low vegetation, usually one species (perennial plants or low shrubs), with reduced maintenance intensity, that densely and permanently covers the bare ground  |             |
|             | Lawn   | An area planted with grasses, kept at a short height and used for aesthetic and recreational purposes   |             |
|             | Green Pavements  | Pavements with soil-filled gaps with filtering properties and with specific creeping grass species of low growth and minimal maintenance requirements   |             |
|             | Street Trees   | Trees planted along roads in compliance with standards (regulations)  |             |
|             | Park Trees   | Trees planted in green (vegetated) areas that are not traffic areas or city squares   |             |
|             | Fruit Trees/ Fruit Shrubs  | Trees or shrubs grown for the production of edible fruits or seeds  |             |
|             | Large Shrubs   | Shrub species/shrub varieties that grow to a height of more than 2 m  |             |
|             | Rain Gardens (under-drained)   | Shallow basins which are filled with a porous soil mix and covered with native vegetation, designed for rainwater retention, filtration and infiltration  |             |
|             | Road-side Swales for Retention and Infiltration  | Vegetated open drainage channels to reduce the runoff volume and to retain, filter and infiltrate rainwater   |             |
|             | Linear Wetlands for Storm Water Filtration   | Flat, linear basins with impemeable bottom, filled with porous soil-gravel mixture and covered with native vegetation designed for retention and filtration of rainwater by surface and subsurface flow                   |             |
|             | Natural Pollinators' Modules   | Terrestrial micro-habitats (10-20 m <sup>2</sup> ) designed to attract pollinators (and biodiversity in general) and consisting of plants, living space for creatures and water sources (elements of site furnishing)     |             |
|             | Hedge/Hedgerow   | Shrubs planted in rows forming a physical boundary (a hedge), in association with other plants and physical features  |             |
|             | Rockery  | Small gardens with aesthetically arranged rocks/stones, with small gaps in between, where small plants are rooted and animals find habitat  |             |
| Herb Spiral | Small gardens constructed as raised, cone-shaped spiral beds with multiple levels to provide herbs with a variety of growing conditions. |   |             |



| Rooting             | NbS Name  | Definition  | Arrangement         |
|---------------------|---|---|---------------------|
|                     | Urban Wilderness/Succession Area                  | Vegetated areas in the urban area where spontaneous but controlled succession takes place. Maintenance measures aim at the sustainable provision of ecosystem services by a diverse, self-sustaining plant community (many species).  | vertical/horizontal |
|                     | Ground Crops of Vegetables/Herbs                  | Small gardens created for the cultivation (beds, containers) of vegetables/herbs  |                     |
|                     | VRSS Slopes (Railway Lines) with Green Fences     | Wooden fences overgrown with climbers and shrubs on a vegetated/vegetated ground slope/ground embankment (VRSS), acting both as green safety elements and biodiversity habitats, separating the space for pedestrians or cyclists     |                     |
|                     | Green Pergolas/Green Arbours                      | Structures that support vines or climbing plants and create shaded or semi-shaded spaces. They are characterised by two or more posts or columns and open roofs and can be free-standing or attached to buildings                     |                     |
| Ground or Container | Green Facades with Climbing Plants                | Walls that are fully or partially covered with greenery (winding or self-climbing plants). They can be espalier systems to hold the plants rooted in the ground or in containers  | vertical            |
|                     | Wall-mounted Living Walls                         | Structures attached to cement walls (continuous or modular) containing organic or inorganic nutrient media in which the plants take root. Water and nutrients are supplied by an automated irrigation system.                         |                     |
| Container           | Hydroponic Mobile Living Walls/Vertical Gardens   | Self-supporting constructive systems based on a metal structure equipped with a waterproof layer, a hydroponic textile substrate for plant growth, a water collection system and an automatic irrigation system                       | vertical            |
|                     | Vertical Vegetable/Herb Gardens                   | Vertical freestanding or wall-mounted structures for growing vegetables or herbs outdoors   |                     |
|                     | Hanging Wall Planters (as Green Street Furniture) | Baskets, flower pots, boxes, etc. with decorative perennials, hung on walls, posts, fences, sheds, balustrades, etc.  |                     |
|                     | Compacted Pollinators' Module                     | Micro-habitats (4 - 5 m <sup>2</sup> ) created in planters with impermeable soils to attract pollinators (and biodiversity in general); consisting of plants, dwellings for creatures and water sources (elements of site furnishing) | horizontal          |
|                     | Rain Gardens in Planter (=self-contained)         | Boxes / pots with impermeable grounds, filled with porous soil mixture and covered with native vegetation; aim: retention and filtering of storm water  |                     |
|                     | Street Planters (as Green Street Furniture)       | Free-standing planters in different shapes, sizes and made of different materials, e.g. wood, concrete, metal, recycled plastic, fibreglass. Street planters can be used to plant not only perennials but also shrubs and trees.      |                     |
|                     | Green Covering Shelter                            | Very light type of green roofs covered with very light, thin substrate and flat vegetation; installed on small or large covers, such as bus shelters or covered shelters  |                     |
|                     | Green Roof/Roof Terrace                           | Exterior top covers of buildings to encourage the growth of vegetation; consisting of several layers that ensure waterproofing and resistance to root penetration and allow the development of plants                                 |                     |



**Annex 6: Nature-based solutions (Nbs) and their potential ecosystem services (ESS)**  
(after material from SiBG - Silesian Botanical Garden 2020)

| Nature based Solutions (Nbs)                      | Ecosystem Services (ESS)   |                             |                       |                                 |
|---|----------------------------|-----------------------------|-----------------------|---------------------------------|
|   | Regulation of Microclimate | Regulation of Water balance | Recreational function | Habitat function → Biodiversity |
| Urban Meadows                                     | 2                          | 1                           | 4                     | 5                               |
| Verges/Flower Beds with Native Perennials         | 2                          | 1                           | 3                     | 5                               |
| Ground Cover Plants                               | 2                          | 1                           | 3                     | 3                               |
| Lawn  | 2                          | 1                           | 2                     | 1                               |
| Green Pavements                                   | 1                          | 4                           | 1                     | 1                               |
| Street Trees                                      | 5                          | 5                           | 3                     | 4                               |
| Park Trees  | 5                          | 5                           | 5                     | 5                               |
| Fruit Trees/ Fruit Shrubs                         | 3                          | 2                           | 4                     | 4                               |
| Large Shrubs                                      | 4                          | 4                           | 4                     | 5                               |
| Rain Gardens (under-drained)                      | 4                          | 5                           | 3                     | 4                               |
| Road-side Swales for Retention and Infiltration   | 3                          | 5                           | 1                     | 2                               |
| Linear Wetlands for Storm Water Filtration        | 3                          | 5                           | 1                     | 4                               |
| Natural Pollinators' Modules                      | 5                          | 4                           | 2                     | 5                               |
| Hedge/Hedgerow                                    | 4                          | 3                           | 4                     | 4                               |
| Rockery   | 2                          | 1                           | 3                     | 3                               |
| Herb Spiral                                       | 2                          | 1                           | 3                     | 3                               |
| Urban Wilderness/Succession Area                  | 4                          | 3                           | 4                     | 5                               |
| Ground Crops of Vegetables/Herbs                  | 2                          | 1                           | 4                     | 2                               |
| VRSS Slopes (Railway Lines) with Green Fences     | 4                          | 4                           | 2                     | 5                               |
| Green Pergolas/Green Arbours                      | 4                          | 1                           | 4                     | 2                               |
| Green Facades with Climbing Plants                | 5                          | 3                           | 3                     | 3                               |
| Wall-mounted Living Walls                         | 5                          | 1                           | 3                     | 3                               |
| Hydroponic Mobile Living Walls/Vertical Gardens   | 5                          | 0                           | 3                     | 1                               |
| Vertical Vegetable/Herb Gardens                   | 2                          | 0                           | 4                     | 1                               |
| Hanging Wall Planters (as Green Street Furniture) | 2                          | 0                           | 3                     | 1                               |
| Compacted Pollinators' Module                     | 5                          | 4                           | 2                     | 5                               |
| Rain Gardens in Planter (=self-contained)         | 4                          | 5                           | 1                     | 4                               |
| Street Planters (as Green Street Furniture)       | 3                          | 0                           | 1                     | 2                               |
| Green Covering Shelters                           | 5                          | 3                           | 2                     | 2                               |
| Green Roof/Roof Terrace                           | 5                          | 3                           | 5                     | 4                               |

Classification of the potentially achievable ESS of the respective Nbs: 0 = no potential to 5 = very high potential

**Annex 7: Overview map of the boundary of green deficit areas in Erfurt (Germany) including potential acupuncture sites and selected sites.**

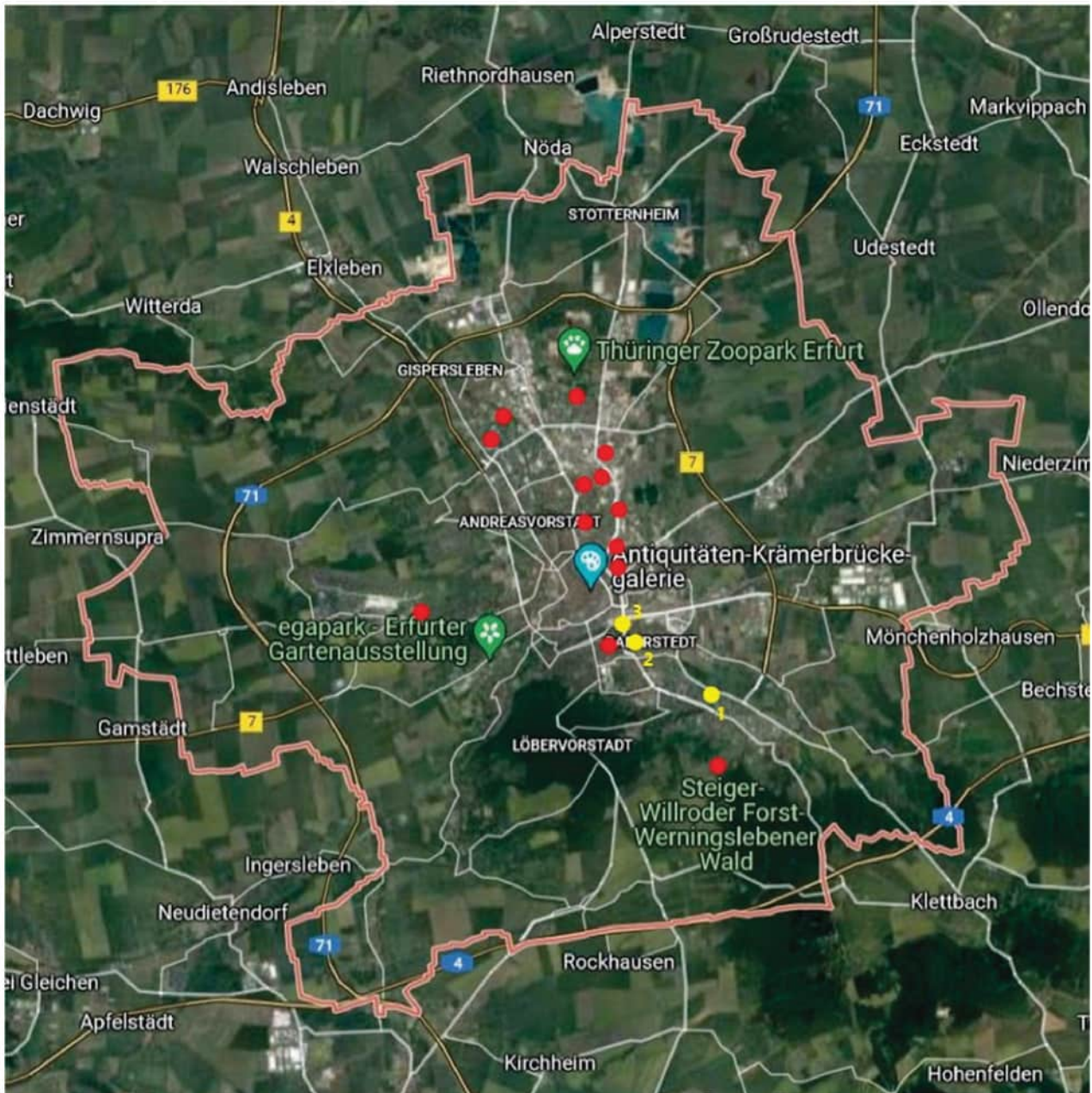


Fig. 11: Overview map of the boundary of green deficit areas in Erfurt (Germany) including potential acupuncture sites and selected sites. (●) as well as over selected acupuncture sites: Kömerstraße (● 1), Holbeinstraße (● 2) and Spielbergtor (● 3). Source: C. Bachmann (2022).



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## Annex 8: References

Bachmann, C. (Impulsregion Erfurt, Jena, Weimar, Weimarer Land) (2021): Personal Communications.  
SiBG (Silesian Botanical Garden); Trząski, Leszek; Galej-Ciwiś, Katarzyna (SiBG) (2020): Transnational concept of local trainings on urban environmental acupuncture (UEA) (D.T1.3.1) and training materials in national languages (D.T1.3.2). Training materials for UEA in of the SALUTE4CE project.