REPORT D.T2.5.1

GUIDELINE FOR DEVELOPING & IMPLEMENTING ACTION PLANS IN CITIES

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Annexes - Tables

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

"Action Plan for the City/FUA 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/FUA
   - 2.1 Challenges (initial situation)
   - 2.2 Visions and aims of the City/FUA
   - 2.3 Involvement of stakeholders and inhabitants
   - 2.4 Work program and schedule
3. Urban Environmental Acupuncture sites in the City/FUA
   - 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)
Green deficit area Erfurt according to the Impulse Region action plan (July 2021)	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^2), 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?

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** *(short description in 1-2 sentences)*
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 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.

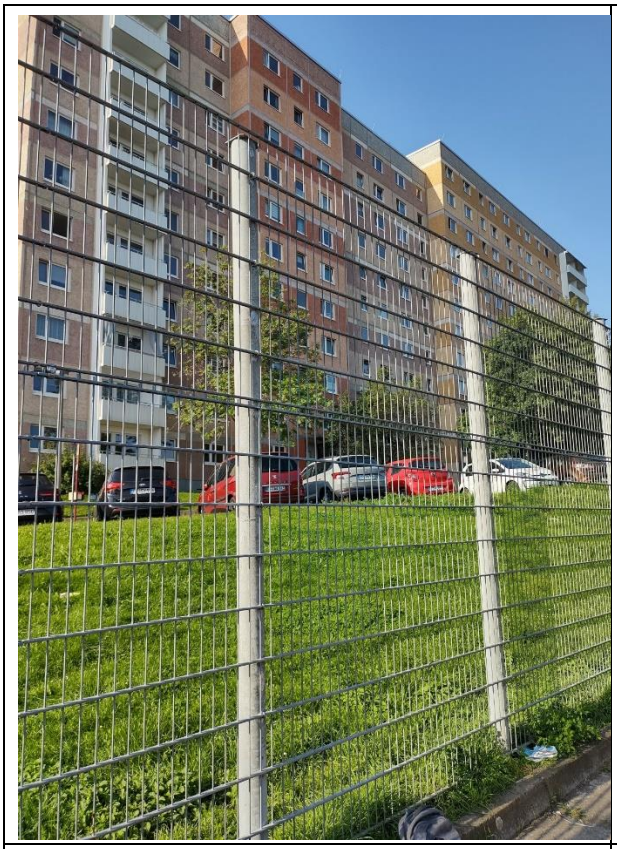

Fig. 1: Impression on Site 1 “Körnerstraße“, Erfurt. Photo: J. Hemingway.

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 for the Local Population	1	Creation of "neighbourhood spaces" for recreation and social-izing.	2	1	
	1	Creation of a positive identity of the site and its surroundings	2	0	
	1	Increasing the visual attractive-ness 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 in-creasing 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 microcli-mate (e.g. reduction of the ex-posure 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/ 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**	

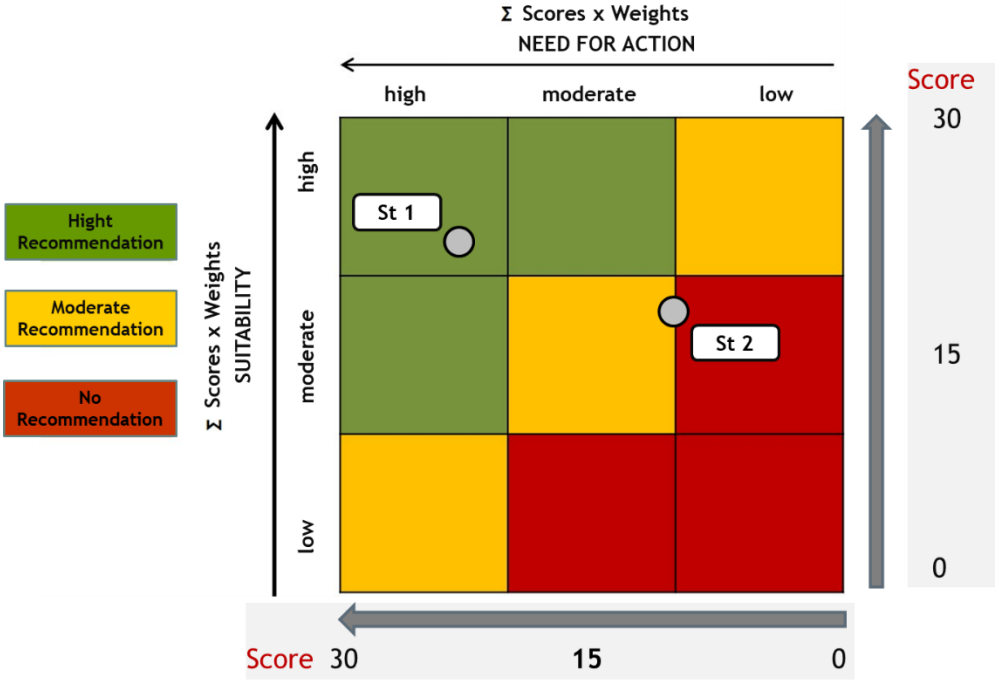

Fig. 5: McKinsey matrix for the selection of acupuncture sites: Maximum possible total score without weights for need for action and suitability 30 each; example for two sites in Erfurt (Germany); site 1: Körnerstraße (St 1), suitability 22 points, need for action 22 points), site 2: Holbeinstraße (St 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^2-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 14th 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	+	+	+	+	+
Conclusion: "Yes" or "No	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**

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 weights 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 14th 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 14th September 2021

Categories Benefit Eco System Services	Weight Factor (1 / 2)	Examples for Benefits	Individual Scores from Services (0; 1; 2; 3; 4; 5)				
			NbS A	NbS B	NbS C	NbS D	NbS E
Microclimate Air quality Noise	1	Reducing human exposure to heat Improving air quality Reduction of noise	2	2	4	4	4
Water Balance	1	Improving storm water management (e.g. local use of excess storm water, infiltration into the ground, local retention) Linking green spaces with storm water infrastructure De-sealing	1	1	3	3	2
Green Space 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 Promote heat and drought tolerant species/varieties Support of a local NGO/citizen initiative for the conservation of green spaces	5	4	3	1	2

Categories (Eco System Services) (Benefit)	Weight Factor (1 / 2)	Examples for Benefits	Individual Scores from 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). Providing food for wildlife (e.g. small animals, butterflies, other pollinators, birds) Protection/enhancement of native biotopes, especially ecologically important/endangered ones Strengthening urban soil protection/soil restoration	5	5	5	5	3
Quality of Stay	1	Increasing synergies between different functions, reducing conflicts. Increasing safety when staying at a particular site Increase/create visual attractiveness of the site 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 Increasing the feeling of safety Creating a positive identity of the site and its surroundings 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 Spatial-functional linkage with existing/planned green-blue infrastructure. 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**

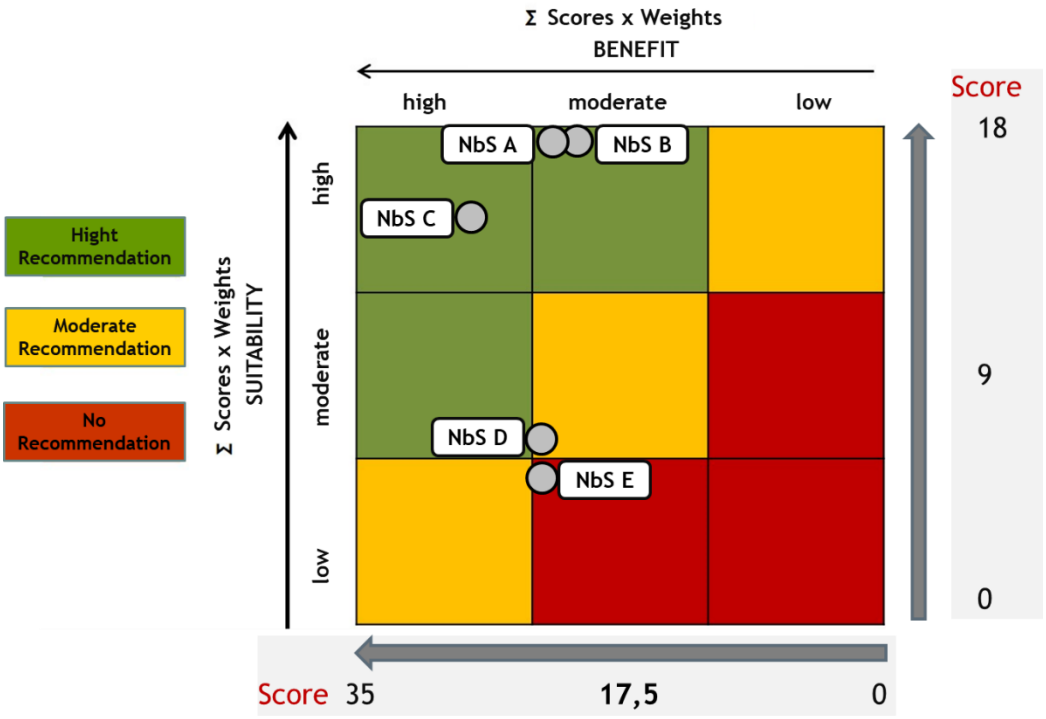

Fig. 10: McKinsey matrix for the assessment of NbS types under aspects of use at the acupuncture site; example of five NbS types for the example area "Spielbergtor" in Erfurt (Germany). Suitability for upgrading: 9 categories; maximum total score: 18 = 9*2*1 (if all weights 1), 36 = 9*2*2 (if all weights 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 (underdrained)	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 impermeable 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^2) 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.	
	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).	
	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	vertical/horizontal
	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	
	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^2) 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 over the boundary of the green deficit area in Erfurt (Germany) and over potential acupuncture sites as well as over selected acupuncture sites

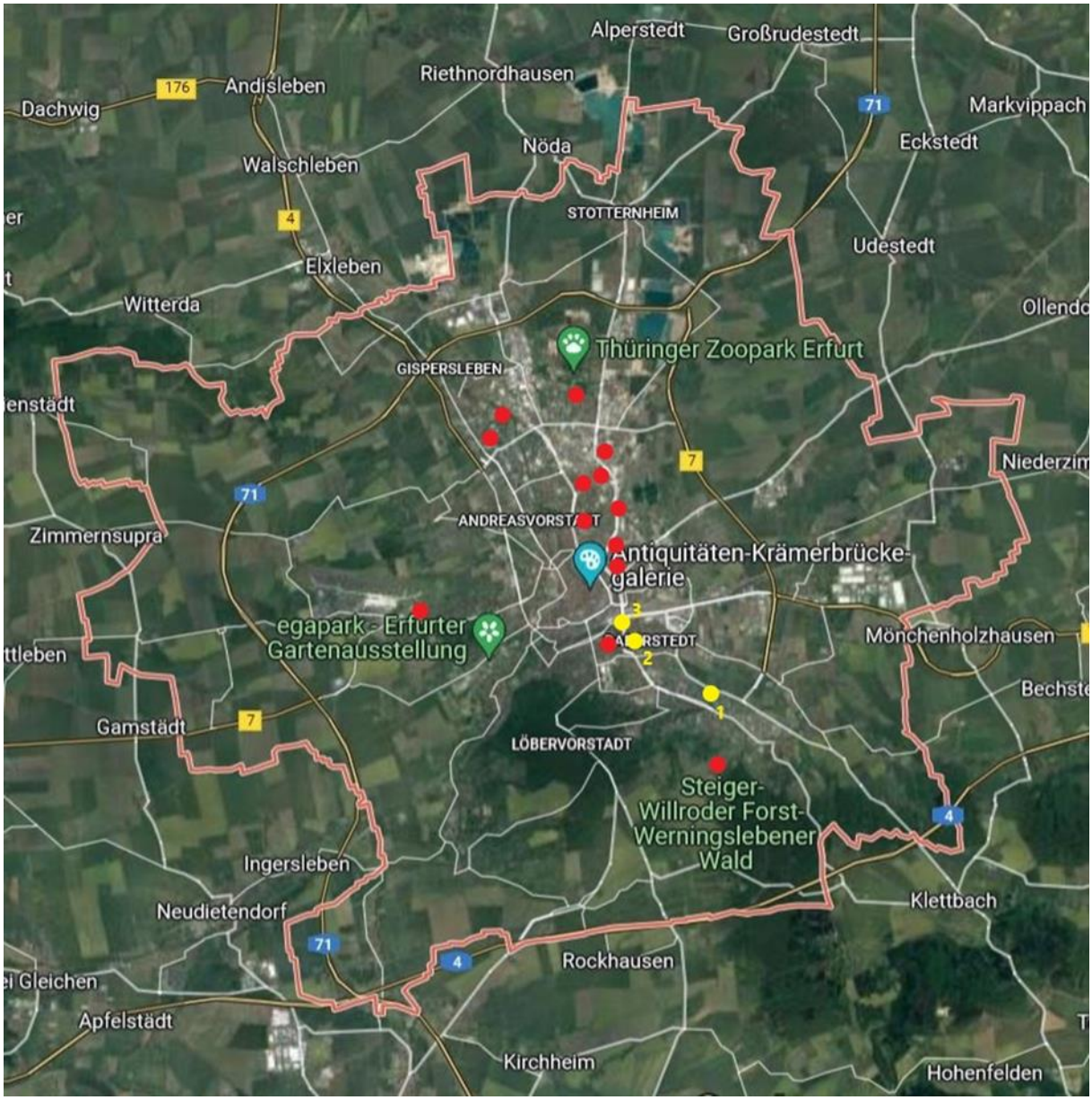

Fig. 11: Overview map over the boundary of the green deficit area in Erfurt (Germany) …. and over potential acupuncture sites (.) as well as over selected acupuncture sites: Körnerstraße (.1), Holbeinstraße (.2) und Spielbergtor (.3). Source: Bachmann (2021).

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.