REGREEN
NATURE-BASED SOLUTIONS

Fostering nature-based solutions for smart, green and healthy urban transitions in Europe and China

Deliverable **N°8.5**

**WP N°8** Innovation and impact creation

# DECISION SUPPORT TOOL ONLINE

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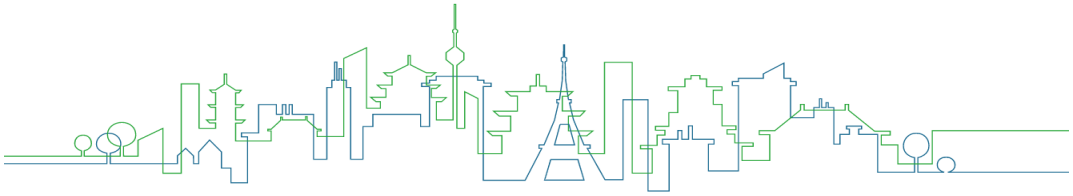

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## EXECUTIVE SUMMARY

This Decision Support Tool (DST) online document describes the structure and content of the decision-support tool. In this document, we provide the rationale behind the tool, the tool purpose, and the co-relation of the tool within the platform “Nature Solutions “, and with the official REGREEN website.

We illustrate the process of building the tool with the support of REGREEN partners in correlation across work packages. The process of tool building was highly dependent on the experience of NBS experts in REGREEN. The online Decision Support Tool is primarily intended to present relevant findings of the REGREEN project and to offer information concisely and understandably for users of the tool to decide on replicating actions that were taken within the REGREEN project. We hope that the tool will offer our unique expert experience to the wider community. Also, the content of the tool is targeting the dissemination goals of REGREEN and acts as a digital support to the “Transition Handbook” (D7.4).

We have built the DST flexibly to integrate high quality results until the end of REGREEN in February 2024.

Appendices A to E contain the current fact sheets structured according to the REGREEN Work Packages.

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# 1 DEVELOPMENT OF THE DECISION SUPPORT TOOL (DST)

In this report, we describe the structure and content of the Decision Support Tool (DST). The decision-support tool is an integrated part of the platform ‘’Nature Solutions”(https://nature-solutions.eu/) , and is connected to the official REGREEN website (https://www.regreen-project.eu/).

The aim of the digital platform and web-based DST is to create a digital REGREEN platform as a web page that will gather projects to share insights, knowledge, and experiences across disciplinary and cross-institutional groups – educational and governmental institutions, SMEs, and NGOs. As a starting point in the development of the “Nature Solutions” platform, we have performed internal desk research. During the desk research, we concluded that NBS is a relatively new term and it is only sporadically communicated and “known” to the general public.

The front page of the platform holds an eye-opening front page that leads the viewer directly to the definitions (scrolling down) with access to the aggregator functionality and web-based decision support tool (blue buttons) and a menu on the right upper side for easy access to all parts of the website (*Figure 1*).

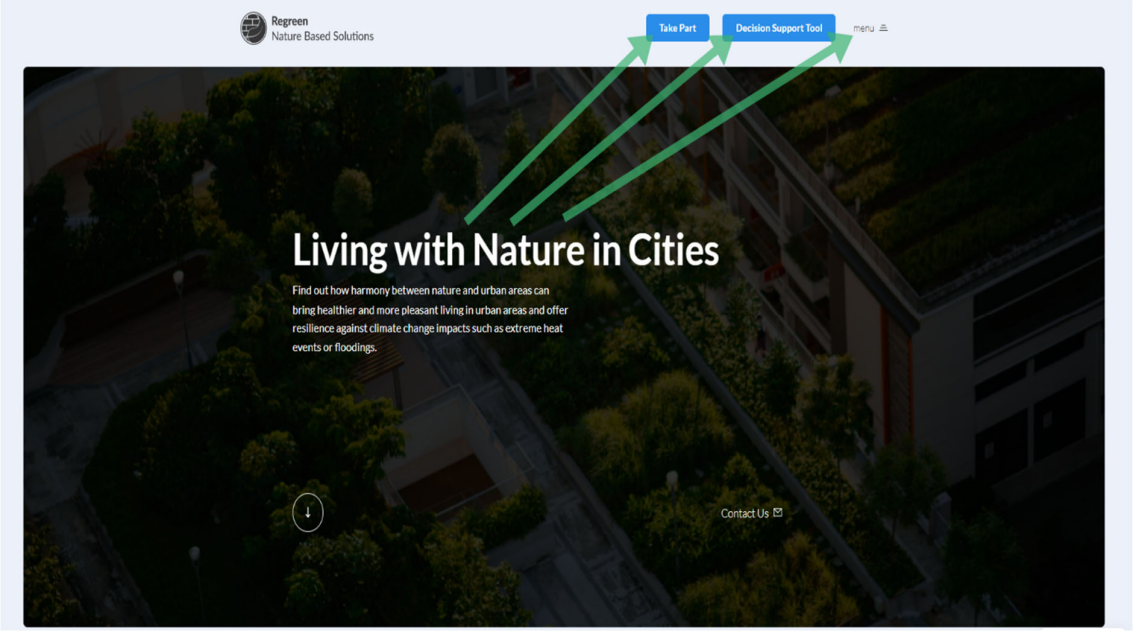



*Figure 1 Front page of platform connected to main functionalities (aggregator and decision-support tool) and navigation*

To build the capacity of the average internet viewer, the Nature Solutions platform offers informative-educative content on NBS. We have worked extensively to explain and transfer the definition of the NBS prepared by the EU Commission and REGREEN partners (*Figure 2*).

According to the European Commission, nature-based solutions (NBS) are solutions that are inspired and supported by nature, they are cost-effective, and simultaneously provide environmental, societal and economic benefits, while building up resilience. NBS must support biodiversity and enhance natural capital.

Nature-based solutions seek to restore damaged ecosystems, create new ecosystems and habitats and improve, enhance or conserve biodiversity. When the functioning of ecosystems is improved through NBS, these ecosystems provide enhanced multiple ecosystem services. These ecosystem services offer multiple social and economic benefits and reduce urban societal challenges such as food security, climate change impacts, water security, human health, disaster risk, social and economic development, whilst also safeguarding nature. NBS can also improve liveability, and in collaboration with other urban priorities, contribute to building inclusive communities, closing social equality gaps, while promoting innovative businesses and jobs. Multifunctionality is key to the NBS concept.

Biodiversity plays a central role in NBS as it is the support of ecosystem functioning, stability and resilience. Biodiverse ecosystems (at the genetic, specific and ecological levels) should be a prerequisite in the design and management of NBS. NBS is based on principles of ecology, especially ecosystem ecology and ecological engineering to protect, manage, and design or restore ecosystems.

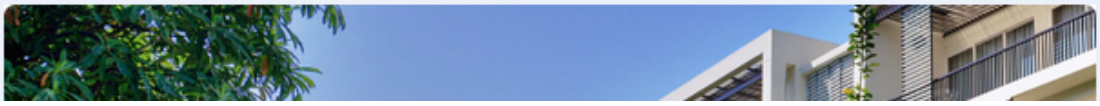


*Figure 2 The definitions of NBS*

The next step was to elaborate and branch out the definitions into categories that were recognised in REGREEN project (*Figure 3*) to build on the definition and further expand the knowledge of the reader, notably:

- Green space with trees;
- Green space with few trees;
- Blue space; and
- Hybrid space.

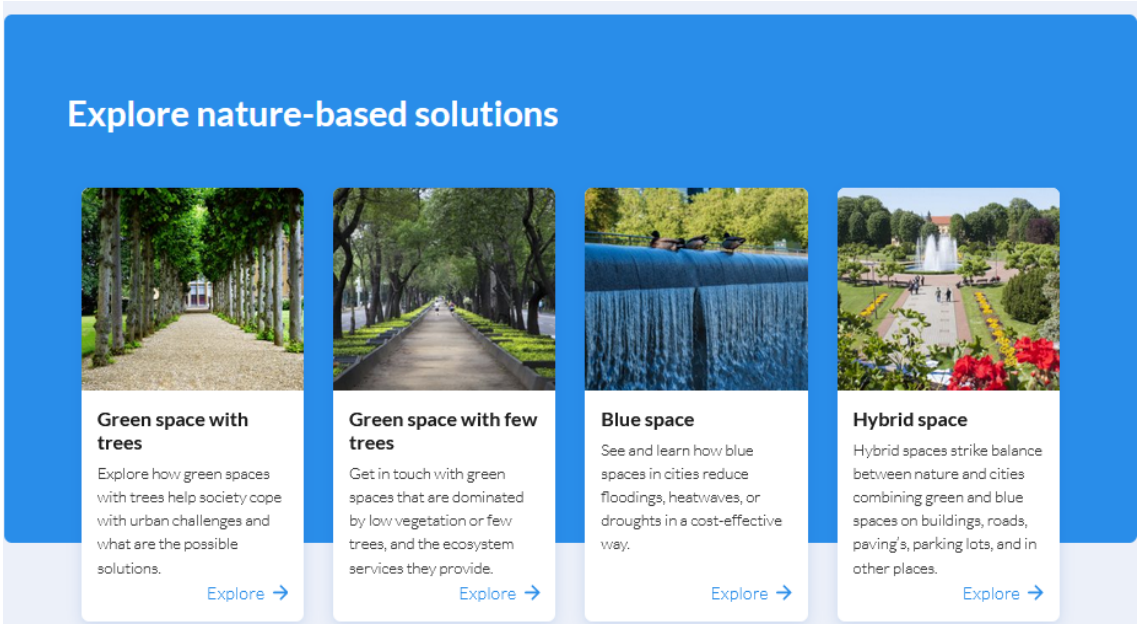



*Figure 3 Categories of NBS*

Each category is described with the most interesting key characteristics. The category branches out further to the NBS types that fall under that category, and provides interactive, informative, and engaging cases (*Figure 4 and 5*).

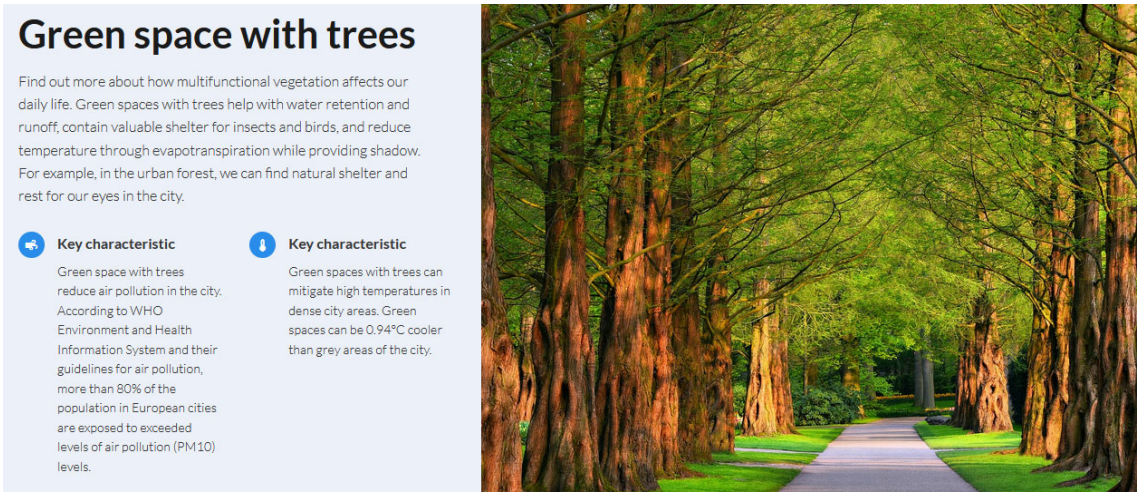



*Figure 4 Example of Green space with trees category*


*Figure 5 Example of Green space with trees category*

After scrolling through the informative general part of the website, visitors will be able to build relevance in the NBS and seek more engagement. This is where the decision support tool is offered both as a blue button on the top of the page and part of the landing page (when scrolling down, Figure 6).

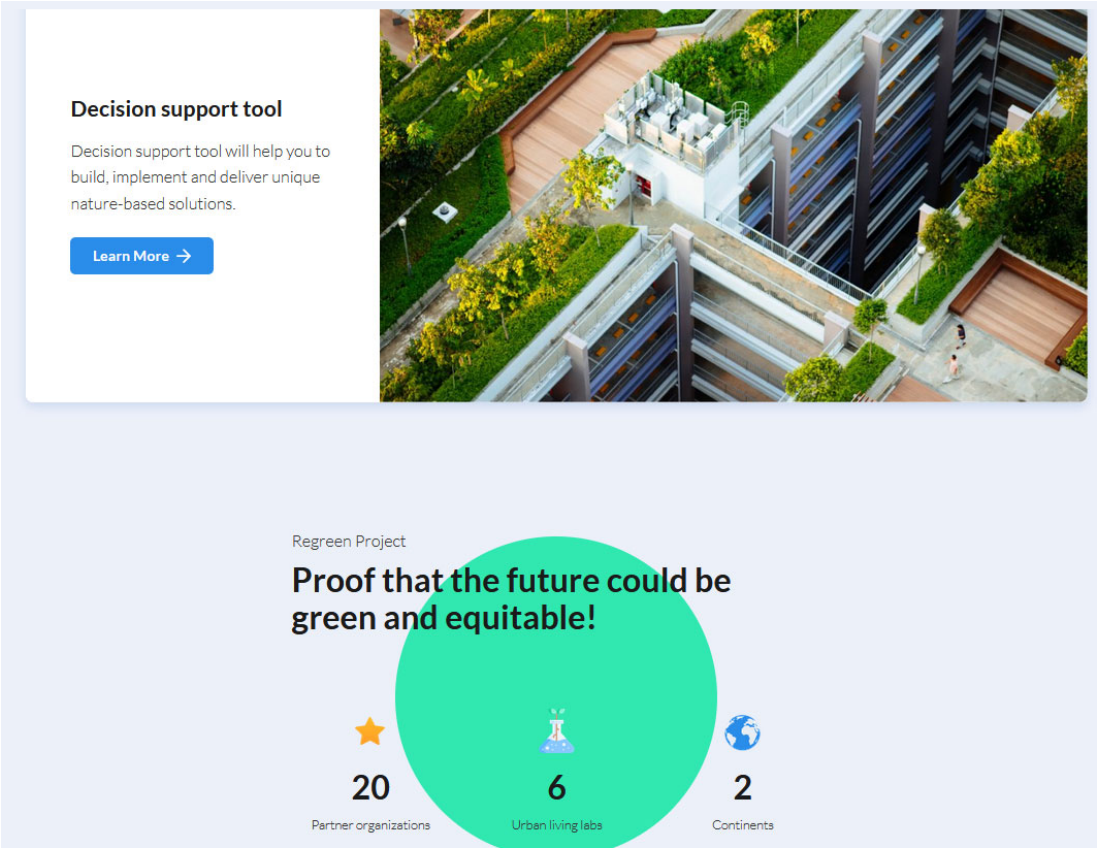



*Figure 6 Position of the Decision support tool on the landing page*

In the development of the DST we have covered the key considerations in decision making, based on activities undertaken in REGREEN. According to Russo (2014), decision-making is the process whereby an individual, group or organisation reaches conclusions about what future actions to pursue given a set of objectives and limits on available resources. This process is often iterative, involving issue-framing, intelligence-gathering, coming to conclusions and learning from experience.

Average internet users might be overwhelmed by the project results and activities (reading large and complex reports and viewing complex tools). To bring the results closer to potential uses, we have created "decision sheets" that logically explain elements of activities answering questions: "Why", "What", "Who" and "Where". Based on these decision sheets offered in the DST, the platform visitors can familiarise themselves with REGREEN activities and they are ready to take the next step on the in-depth exploration of actions and deciding whether or not to replicate or get inspired by them.

The main interest of online visitors is to harness information and experience online and to check what REGREEN activity is interesting to replicate or add to their current level of experience.

To ease the decision, we have gathered relevant information on the REGREEN activities that answer relevant questions stated in "D.2.4 Guidance on development of the toolkit for exploring options and potential benefits of NBS design" (Tuerk , Reis , Jones, & Bird, 2022) to complete the "decision sheets":

- Why should users repeat the REGREEN activity?
- What is the specific REGREEN activity about, what NBS or NBS combinations?
- Who is needed to complete the activity?
- Where and when can a similar activity be replicated?

The main challenges in the DST included:

- Not enough research is based on the multiple benefits of NBS;
- All decision-making on topics of NBS needs to be done locally; NBS is highly dependable on the NBS providers and local climatic and geographical aspects and often use scientific methodologies created specifically for the local environment;
- Many of the ecosystem services that NBS provide do not appear in the markets; therefore, they are ignored by policy and business decision-makers (they are mostly provided "free", but require running monitoring and maintenance costs); therefore, many of these "free" services are not valued. Consequently it's not possible to design a one size fits all decision support tool;
- The REGREEN outputs and research vary significantly in terms of results to be interconnected and providing informed decision making.

This deliverable is connected to all Work Packages in REGREEN and it shares the main results of tasks. The tool structure is mainly built upon the following tasks, though it recognises and provides decision making materials connected to WP2 to WP6:

- Task 2.5 Informing Solutions; and
- Task 3.4 Develop tools and guidelines for mapping and modelling ecosystem services.

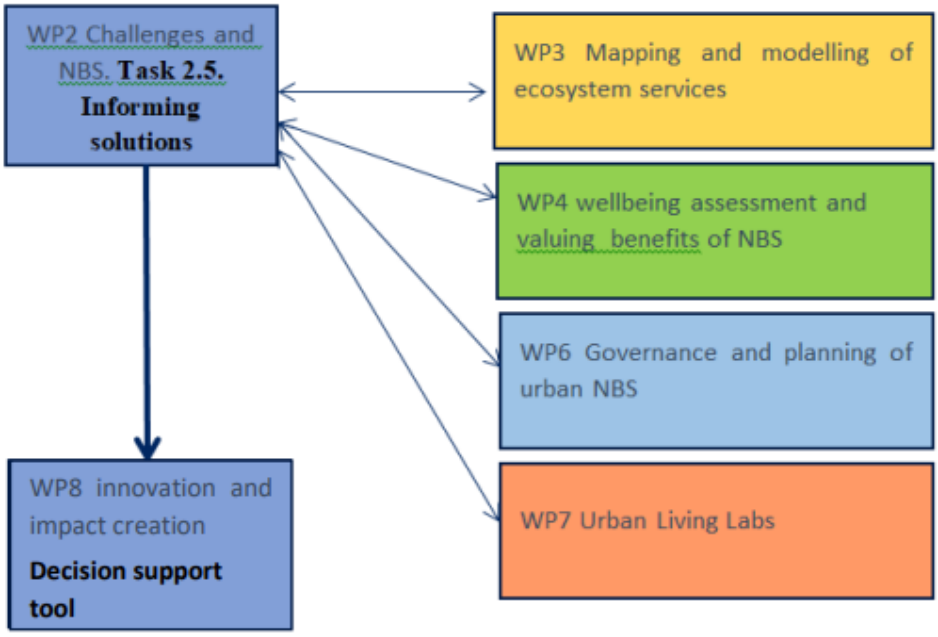



*Figure 7 Interlinkages of T2.5 and WPs (Tuerk , Reis , Jones, & Bird, 2022)*

# 2 TOOL CONTENT

We have collected focused information that summarises the work of REGREEN partners describing objectives and demonstrating the scope and goals in the decision sheets. The decision sheets show the key objectives and performance of each activity. Each sheet contains instructions for the partners on how to complete the decision sheet and the rationale behind it.

## 2.1 Content

All Work Packages contributed to populating the decision sheets, offering elemental information about their activities and providing platform viewers with relevant and concise information. The main deliverables and results that have been included to date in the decision sheets are listed below.

**WP2 – Challenges and NBS**

- NBS knowledge base
- Report on cost-effectiveness
- Guidance on development of toolkit of exploring options and potential benefits of NBS design

**WP3 – Mapping and Modelling Ecosystem Services**

- Guidelines for a depaving
- Mapping and modelling

**WP4 – Wellbeing Assessments and Valuing Benefits of NBS**

- Benefit valuation
- Research articles (on perception & valuation)
- Report on mixed method triangulation

**WP5 – Education, Participation and Awareness**

- Education platform experience
- Effects and consequences of implementing citizen science programmes in schools
- Articles (co creative vegetation, environmental learning as cultural learning, environmental learning mediated through technologies)

**WP7 – Urban Living Labs**

- Report on ULL transition workshops
- NBS transition handbook

**WP8 – Innovation and Impact Creation**

- Stakeholder dialogues
- Start-up accelerator programmes
- Exploitation and replication plan
- Prospectus for NBS Business Investment

## 2.2 Instructions on how to complete the fact sheet document

Below are instructions prepared for REGREEN partners to complete the decision sheet. The idea of an online DST is to gather our experiences (activities that we have carried out, *or will*) in the REGREEN project. We present activities in a decision sheet (table) that serves as a quick screening for the Nature Solutions platform visitors to decide if they want to repeat the activity. The plan is to capture: Regreen activities, methodologies, processes, tools, how to organize stakeholder events, educate children, capture information, provide insights, measure benefits, pressures, etc.

Partners were asked to keep in mind at all times: How does your activity/process in REGREEN help building, implementing and delivering NBS?

Instructions were as follows:

**How to use this factsheet?**

Right below this text you can find guiding questions that will help you to fill in the fact sheet. As you go true the document you can go back to text with guiding questions to understand what kind of information is needed.

***The logic behind it*** – when the site visitors enter decision sheet and read it, they should obtain the next answers:

Why should they repeat the activity from Regreen project (meaning your activity on the project)?

What is the activity about?

Who do they need to complete the activity?

Where and when can they replicate the activity?

Why are the activities completed?

### *i) 'Why' set of questions*

**Explaining needs** - What needs does your activity address? What is the reason behind your activity? Why was the activity developed? What will it be used for?

**Explaining benefits from using process, tools & other developed** – What is the benefit behind of your process or activity? How does your activity affect specific groups? How will the activity help to build, implement and deliver NBS?

**Explaining innovative potential -** Describe your innovative approach if there was any? Describe innovative outcomes? Describe how it will affect the NBS market, community, research, etc.

### *ii) 'What' set of questions (scale and scope)*

**Short description of your activity/task/other**- describe shortly your activity up to 5 – 10 sentences (up to 800 characters). The questions below will help you describe in-depth, but keep it short (it is not mandatory to follow these questions and to answer them all):

1. What problem are you solving?
2. What is your goal?
3. Name of method/tool/activity/process/etc.?

4. Who did you involve to solve the problem?
5. How much change is your solution bringing?
6. Are you certain this will solve the problem?

**Type of activity/intervention** - enter the type of intervention you did within the project (workshop, tool, mapping, research, other).

**NBS Type** - enter the type of NBS that was part of the activity.

**Extensiveness** – Can you estimate time needed to get acquainted with activity, method or tool? Can you estimate the time needed to carry out the whole activity? Can you estimate how much money is needed to pay for an activity, or other resources?

**Competencies**– What are the estimated competences needed for the process at hand?

### *iii) 'Who' set of questions*

**Stakeholders** – State typical partners and stakeholders needed for the activity to be carried out. Who should repeat your activity (e.g., public authority, a private company, community group, other public bodies etc.)? Who can do it (e.g., engineer, NBS expert, finance expert, project manager, etc.)? Who needs to feed you with information and approvals to get activity done (e.g., ministry, local authority, buyer, etc.)?

### *iv) 'When' set of questions*

**Main conclusions** - write relevant conclusions and finishing thoughts on the topic. How do you see the future of your activity? Why it is relevant? What should we pay attention to as different groups of society? What are the next steps? When should one perform the activity?

### *v) 'Where' set of questions*

Where will your project activity be visible? Where will it be delivered? Where it is suitable to happen?

**Location of applicability -** Where is your project activity visible (or will be)? Where will it be delivered? Where it is suitable to happen next?

**Weblink** - to the website, to patent, to picture or video, etc. (**please add visual materials as much as possible since we are visual creatures and respond best to that group of content**), I will, later on, add it directly to the fact sheet.

**Contact point** – Here you can promote your work. You can leave your contact information if you want to collaborate with someone further on, a contact point will be left if someone sees value and wants to continue the work or partner up with you directly. Please leave e-mail and LinkedIn contact points.

*Table 1 First draft of the decision sheet*

| **Logic** | **Please enter the title of your activity** | | |
|---|---|---|---|
| *Why?* | **Needs** | What needs does your activity satisfy? Aim for 3-5 needs. | |
| *Why?* | **Benefits** | State what are the benefits of repeating your activity. Aim for at least 2 – 5 benefits. | |
| *Why?* | **Innovative potential** | State what is the innovative potential in your activity (up to 3 sentences). | |
| *What?* | **Short description** | Please describe your activity up to 5 sentences or maximum 800 letters. | |
| *What?* | **Activity** | Type what is your activity/intervention type? (e.g., workshop, mapping, website creation, education, etc.), | |
| *What?* | **Type of NBS** | Choose an item. | |
| *What?* | **Extensiveness** | What resources are needed to carry out the activity (time, money… other)? You can give a rough estimate. | |
| *What?* | **Competencies** | What skills should people have that are engaged in your activity? | |
| *Who?* | **Stakeholders** | State who should repeat activity/who can carry out the activity/who else is needed to succeed in making it happen. | |
| *Where?* | **Location** | Where did it happen? Where should it happen next? | |
| *When, where, why?* | **Main conclusions** | Insert up to 5 sentences of main conclusions, the next steps, and finishing thoughts. | |
| *Where?* | **Web-link** | Insert web links to relevant content if any (e.g. pictures, videos, tools, maps, databases, reports …), please upload to Aarhus drive, or your own. Rename the document that you are uploading to WPx , Title of activity.doc, and link it here. | |
| *Where?* | **Contact point** | Leave your e-mail address here. | Leave your LinkedIn account here. |

*Table 2 Test example of filled tool by one of the REGREEN partners*

| **Logic** | **City Explorer Toolkit** | | |
|---|---|---|---|
| *Why?* | **Needs** | Visualise and calculate multiple benefits provided by urban green and blue space (NBS); Help planners decide optimum locations for green and blue space placement; Explore scenarios of green and blue space in different locations; | |
| *Why?* | **Benefits** | Better spatial planning of green and blue space (NBS) | |
| *Why?* | **Innovative potential** | A novel modelling tool that shows spatially-specific benefits from NBS at fine scale in cities | |
| *What?* | **Short description** | The tool allows users to map and quantify multiple benefits from NBS, and to use scenarios to explore different locations to implement them | |
| *What?* | **Activity** | On-line modelling/mapping tool | |
| *What?* | **Type of NBS** | Choose an item. | |
| *What?* | **Extensiveness** | Time to use the on-line tool, limited skills required | |
| *What?* | **Competencies** | No specialist skills required | |
| *Who?* | **Stakeholders** | Planners; municipal authorities; | |
| *Where?* | **Location** | Currently tool is set up for Paris, but can be extended to any city | |
| *When, where, why?* | **Main conclusions** | The tool is currently in a Demonstration Pilot phase, but will be developed further, as part of REGREEN and other projects. | |
| *Where?* | **Web-link** | No web-link available yet | |
| *Where?* | **Contact point** | lj@ceh.ac.uk | Google Scholar https://scholar.google.co.uk/citations?user=K1qMpYcAAAAJ&hl=en |

# 3 TOOL STRUCTURE

The DST is built for various stakeholder groups: SMEs, communities, local authorities, and others. The first question in the tool identifies the platform visitors as part of a NBS organisation or other (see *Figure 9*). According to that choice, the platform visitors receive information in form of decision sheets created specifically to describe our activities (*Figure 10*). The Document "fact sheet" provides fundamental descriptions to user groups and informs them of the implementation possibility of different activities and the requirements involved. These fact sheets aim to help stakeholders to navigate their decisions in order to build, implement and deliver effective and meaningful NBS. Based on the first choice, the users obtain a combination of "decision sheet" documents for preview. This enables three combinations of the documents and linkage to the in-depth exploration of REGREEN results.

With the project duration until end of February 2024, we expect that further results will bring additional value to the tool as further deliverables and activities are carried out. The initial version of the tool is flexible in terms of accepting additional content and get adjusted to provide best value for the user. Decision sheets created by the Regreen partners can be found on the Decision support tool.

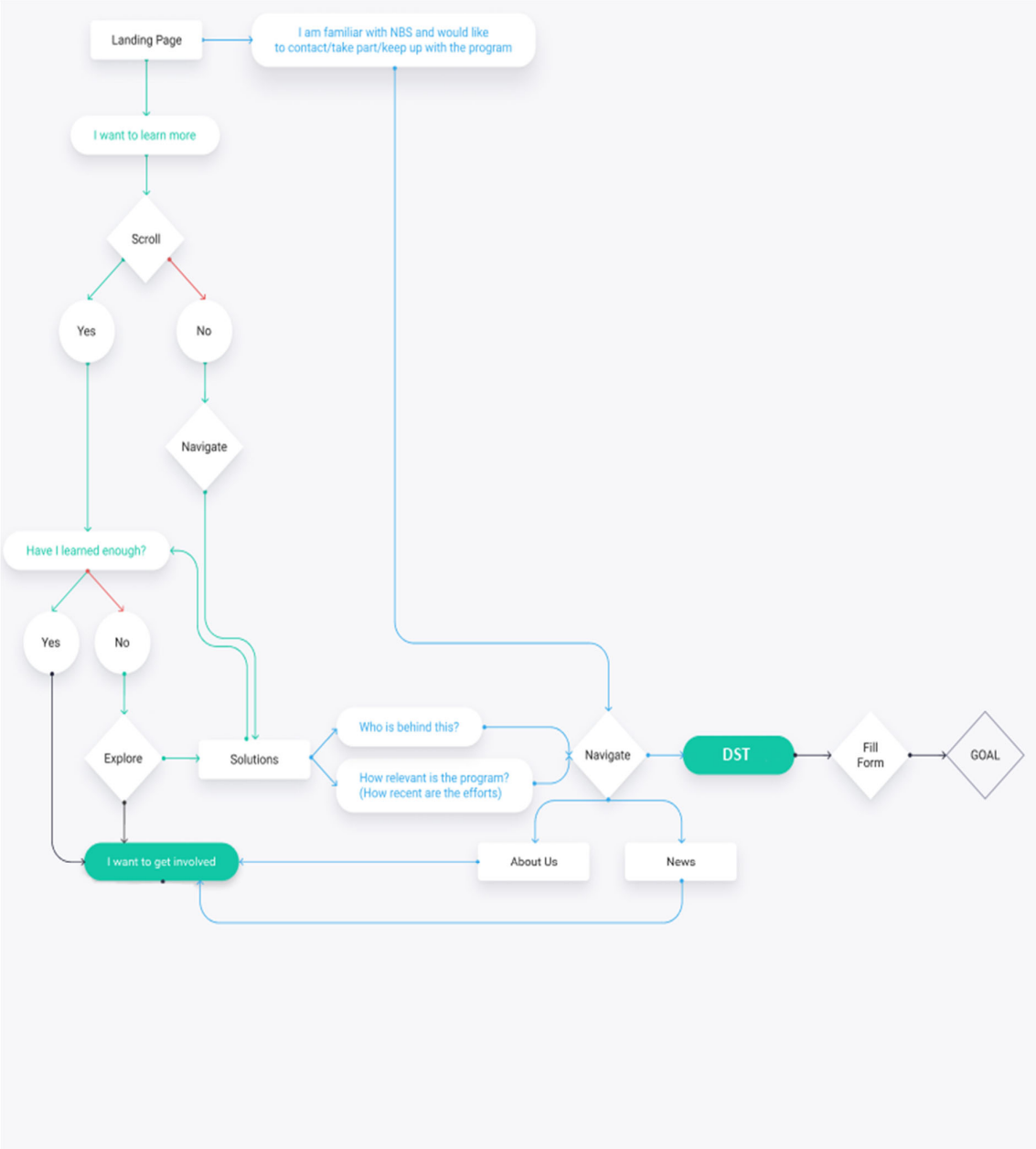



*Figure 8 Structure of the website*

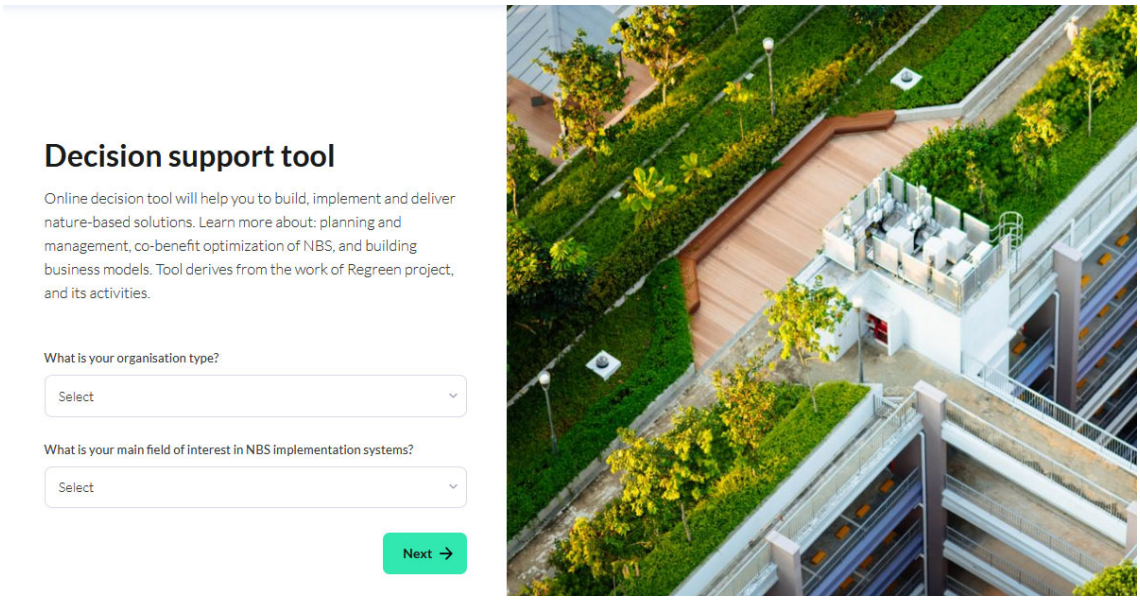



*Figure 9 Step 1. Choosing the organisational type*

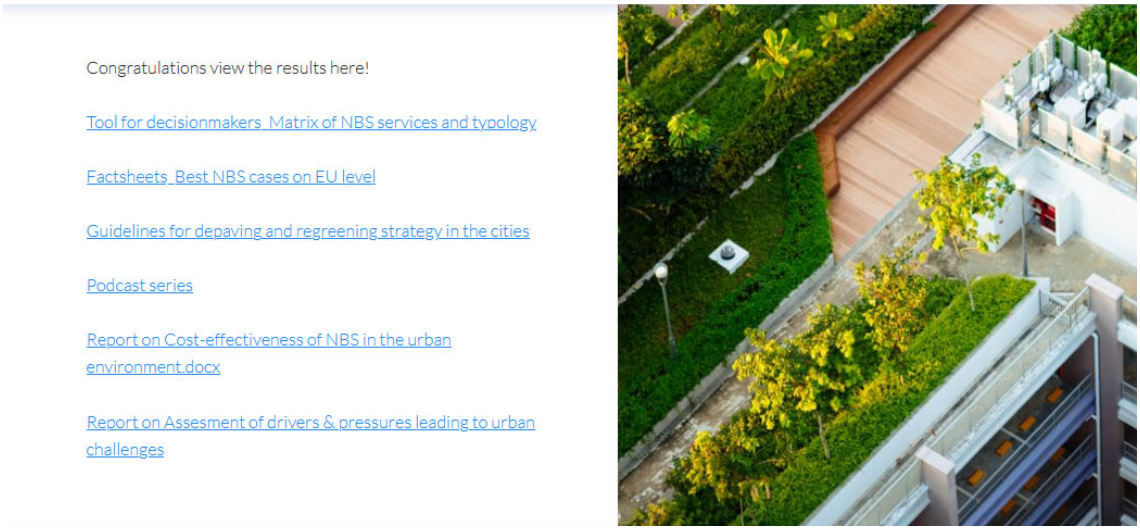



*Figure 10 Step 2. getting the results; pdf "decision sheet" for download and view*

## DECISION SHEET

A decision sheet is created for NBS stakeholders on various levels to gain insights and a sense of activities carried ou by Regreen partners. It offers summarized information for the reader to decide on recreating the activity interactin with the action holder.

| Cost-effectiveness of NBS in the urban environment | | |
|---|---|---|
| **Activity** | Research on the cost-effectiveness of NBS in an urban environment and providing critical insights into green and blue NBS cost overview. | |
| **Benefits** | One of the first reports on cost figures and evaluation of the cost-effectiveness of different NBS. | |
| **Needs addressed** | Explaining the bond between multiple policy objectives and choosing NBS over other land uses; for example building a park over the parking lot. | |
| **Innovative potential** | Tracking and comparing the costs and benefits of NBS to other land uses is the key to achieving sustainable urbanization. | |
| **Competences** | Data scientists and literature overview specialists are needed. | |
| **Stakeholders** | Urban planners and researchers. | |
| **Location, timing** | A long-term overview of ecosystem services and the costs of NBS is needed to provide decision-makers with the right set of information in the phase of spatial planning. | |
| **Type of NBS** | Green and blue NSB | |
| **Main conclusions** | The effectiveness of urban nature areas can be generally assessed and compared to other natural areas while addressing urban pressures. | |
| **Explore more** | Link | |
| **Contact point** | Toke Panduro | Leave your LinkedIn account here. |

| Source | Short description | Country | Year | Establishment Euro/m² | Maintenance Euro |
|---|---|---|---|---|---|
| | | | | 26.14 € | |
| Narayanan & Pitt (2006) | Pond | USA | 1996 | 11.11 €<br>24.98 € | 1821.6 €/basin<br>12033 €/basin |
| Chui et al. (2015) | Pond | Hongkong | 2016 | 132.09 €<br>138.62 € | 469.67 €/basin<br>469.67 €/basin |
| Liu et al. (2016) | Pond | China | 2015 | 117.35 € | 3520 € /basin |
| Targino et al. 2019) | Pond | Brazil | 2017 | 4.37 € | |
| Aarhus municipality (2021) | Pond | Denmark | 2021 | 80.69 € | |
| NIRAS (2017) | Stream (1m*1m)<br>Stream (0.5m*1m)<br>Stream (0.5m*2m)<br>Stream (1m*2m) | Denmark | 2017 | 104 €<br>124 €<br>117 €<br>90 € | 3 € (m)<br>5 € (m)<br>3.6 € (m)<br>2 € (m) |
| Tyndall & Bowman (2016) | Wetland | US | 2016 | 0.94 € (m2) | 0.07 € (m²) |
| Aerts (2018) | Wetland | US | 2016 | 4.28 € (m2) | |
| Leon et al. (2018) | Wetland | US | 2018 | 0.04 € (m2) | 0.5 € (m²) |
| L'Institut Paris Region (2021) | River Re-opening<br>River Reopening | France | 2014<br>2012 | 5.8 € (m)<br>13,650 € (m) | |

*Figure 11 The "decision sheet" when opened and viewed*

# 4 CONCLUSIONS

The decision support to NBS stakeholders is a crucial component to provide the basis for real-life-wide valorisation and implementation of NBS, it offers insights to the NBS stakeholders to take informed decisions.

The value of the REGREEN project as a research project is having a scientific approach and developing results that are publicly available and easily picked up by various stakeholders wanting to build on our activities, methodologies, approaches, tools, and other. Most REGREEN activities are ready for real-life use and as such offer enriched perspectives to decision making.

Recognizing this potential, we have built the decision support tool (DST) as a marketplace of REGREEN activities with an easy-to-understand approach and replicable by the diverse users' types of DST developed in the WP8.

The decision support tool targets and contributes to all four REGREEN objectives with different levels of impact:

**O1: To integrate knowledge and evidence on benefits from NBS to address urban challenges**

The DST under this objective promotes good practices and urban liveability with **high impact** being online, widely available tool that shows the project results in compact and interactive way.

**O2: To develop and test tools to guide, design and plan NBS**

The DST contributes to this objective by explaining complex tools and methods used by policy makers and urban planners in layman's English. We rate the impact of this objective as **moderate.**

**O3: To consolidate business and investment models for NBS**

This objective contributes to the overall aims of promoting NBS as the basis for urban liveability by making a case for NBS uptake in business and investment models. We rank the **impact of the online decision support tool as high** since the tool will hold business models of NBS and other methods used for business activation on the level of Regreen project.

**O4: To promote NBS awareness and institutionalisation in education, governance, and planning**

Since the DST isn't strictly focused on urban governance, but also on other actors online in mainstreaming of NBS in strategies, decision support systems, and planning, we rate the impact of the tool on the objective **moderate.**

# 5 REFERENCES

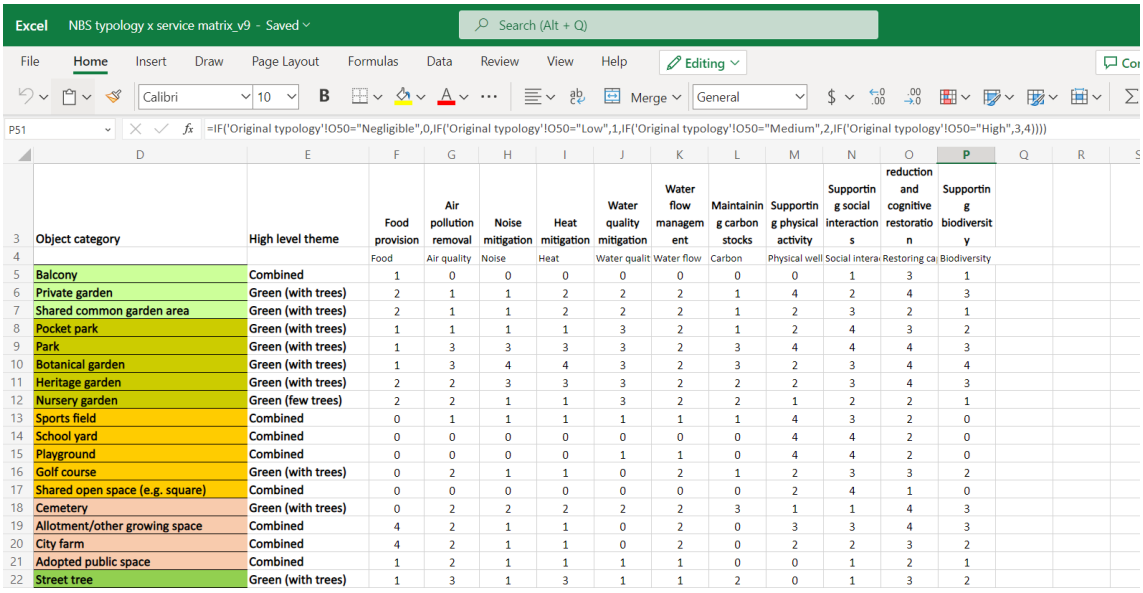
Andreas, Tuerk , A., Reis , S., Jones, L., Bird, N., (2022). *Guidance on development of the toolkit for exploring.* Regreen project .

Russo , E. J. (2014). Decision-making. *Palgrave Publishers Ltd* .

# APPENDIX A - WP2 - CHALLENGES AND NATURE-BASED SOLUTIONS

## Tool for decisionmakers_Matrix of NBS services and typology

| Tool: Matrix of NBS services and typology | | |
|---|---|---|
| **Activity** | Creating a tool that takes into account NBS types and urban drivers and pressures for comparison. | |
| **Benefits** | Using abstract thinking in creating an effective tool for NSB comparison. | |
| **Needs addressed** | There is a scarcity of tools for decision-makers to choose NBS types to implement and compare based on the urban challenges they face. | |
| **Innovative potential** | The scientific review was used to create this tool and it grades the efficiency of NBS per unit area, the typical situation across the city was taken into account and it is aggregated over the year while focusing on the differences between NBS types. | |
| **Competences** | Researchers with an overview of NBS and their characteristics. | |
| **Stakeholders** | NBS decision-makers and researchers. | |
| **Location, timing** | Having a basis on which to decide NBS upon. | |
| **Type of NBS** | The overall approach to all NBS. | |
| **Main conclusions** | An iterative process is needed to create a tool for assessing which NBS is suitable to solve specific urban pressures or a combination of urban pressures giving decision-makers the opportunity for making informed decisions on choosing NBS. | |
| **Web-link** | Link to website? | |
| **Contact point** | Laurence Jones | Leave your LinkedIn account here. |




| Object category | High level theme | Food provision | Air pollution removal | Noise mitigation | Heat mitigation | Water quality mitigation | Water flow management | Maintaining carbon stocks | Supporting physical activity | Supporting social interactions | reduction and cognitive restoration | Supporting biodiversity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Food | Air quality | Noise | Heat | Water qualit | Water flow | Carbon | Physical well | Social intera | Restoring ca | Biodiversity |
| Balcony | Combined | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 1 |
| Private garden | Green (with trees) | 2 | 1 | 1 | 2 | 2 | 2 | 1 | 4 | 2 | 4 | 3 |
| Shared common garden area | Green (with trees) | 2 | 1 | 1 | 2 | 2 | 2 | 1 | 2 | 3 | 2 | 1 |
| Pocket park | Green (with trees) | 1 | 1 | 1 | 1 | 3 | 2 | 1 | 2 | 4 | 3 | 2 |
| Park | Green (with trees) | 1 | 3 | 3 | 3 | 3 | 2 | 3 | 4 | 4 | 4 | 3 |
| Botanical garden | Green (with trees) | 1 | 3 | 4 | 4 | 3 | 2 | 3 | 2 | 3 | 4 | 4 |
| Heritage garden | Green (with trees) | 2 | 2 | 3 | 3 | 3 | 2 | 2 | 2 | 3 | 4 | 3 |
| Nursery garden | Green (few trees) | 2 | 2 | 1 | 1 | 3 | 2 | 2 | 1 | 2 | 2 | 1 |
| Sports field | Combined | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 4 | 3 | 2 | 0 |
| School yard | Combined | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 4 | 2 | 0 |
| Playground | Combined | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 4 | 4 | 2 | 0 |
| Golf course | Green (with trees) | 0 | 2 | 1 | 1 | 0 | 2 | 1 | 2 | 3 | 3 | 2 |
| Shared open space (e.g. square) | Combined | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 4 | 1 | 0 |
| Cemetery | Green (with trees) | 0 | 2 | 2 | 2 | 2 | 2 | 3 | 1 | 1 | 4 | 3 |
| Allotment/other growing space | Combined | 4 | 2 | 1 | 1 | 0 | 2 | 0 | 3 | 3 | 4 | 3 |
| City farm | Combined | 4 | 2 | 1 | 1 | 0 | 2 | 0 | 2 | 2 | 3 | 2 |
| Adopted public space | Combined | 1 | 2 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 2 | 1 |
| Street tree | Green (with trees) | 1 | 3 | 1 | 3 | 1 | 1 | 2 | 0 | 1 | 3 | 2 |

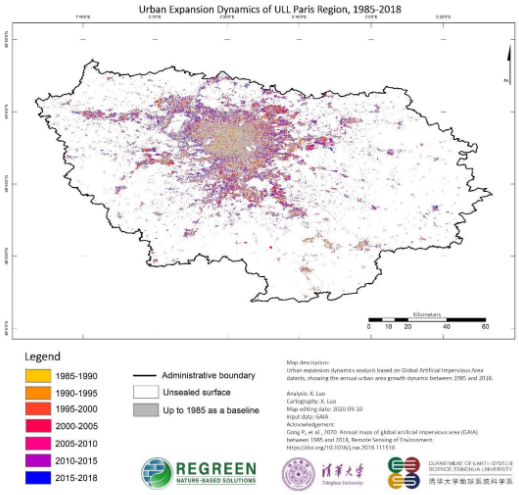
## Report on Cost-effectiveness of NBS in the urban environment

| Cost-effectiveness of NBS in the urban environment | | |
|---|---|---|
| **Activity** | Research on the cost-effectiveness of NBS in an urban environment and providing critical insights into green and blue NBS cost overview. | |
| **Benefits** | One of the first reports on cost figures and evaluation of the cost-effectiveness of different NBS. | |
| **Needs addressed** | Explaining the bond between multiple policy objectives and choosing NBS over other land uses; for example building a park over the parking lot. | |
| **Innovative potential** | Tracking and comparing the costs and benefits of NBS to other land uses is the key to achieving sustainable urbanization. | |
| **Competences** | Data scientists and literature overview specialists are needed. | |
| **Stakeholders** | Urban planners and researchers. | |
| **Location, timing** | A long-term overview of ecosystem services and the costs of NBS is needed to provide decision-makers with the right set of information in the phase of spatial planning. | |
| **Type of NBS** | Green and blue NSB | |
| **Main conclusions** | The effectiveness of urban nature areas can be generally assessed and compared to other natural areas while addressing urban pressures. | |
| **Explore more** | Link | |
| **Contact point** | Toke Panduro | Leave your LinkedIn account here. |

| Source | Short description | Country | Year | Establishment Euro/$m^3$ | Maintenance Euro |
|---|---|---|---|---|---|
| | | | | 26.14 € | |
| Narayanan & Pitt (2006) | Pond | USA | 1996 | 11.11 €<br>24.98 € | 1821.6 €/basin<br>12033 €/basin |
| Chui et al. (2015) | Pond | Hongkong | 2016 | 132.09 €<br>138.62 € | 469.67 €/basin<br>469.67 €/basin |
| Liu et al. (2016) | Pond | China | 2015 | 117.35 € | 3520 € /basin |
| Targino et al. 2019) | Pond | Brazil | 2017 | 4.37 € | |
| Aarhus municipality (2021) | Pond | Denmark | 2021 | 80.69 € | |
| NIRAS (2017) | Stream (1m*1m)<br>Stream (0.5m*1m)<br>Stream (0.5m*2m)<br>Stream (1m*2m) | Denmark | 2017 | 104 €<br>124 €<br>117 €<br>90 € | 3 € (m)<br>5 € (m)<br>3.6 € (m)<br>2 € (m) |
| Tyndall & Bowman (2016) | Wetland | US | 2016 | 0.94 € (m2) | 0.07 € ($m^2$) |
| Aerts (2018) | Wetland | US | 2016 | 4.28 € (m2) | |
| Leon et al. (2018) | Wetland | US | 2018 | 0.04 € (m2) | 0.5 € ($m^2$) |
| L'Institut Paris Region (2021) | River Re-opening<br>River Reopening | France | 2014<br>2012 | 5.8 € (m)<br>13,650 € (m) | |

## Report on Assessment of drivers & pressures leading to urban challenges

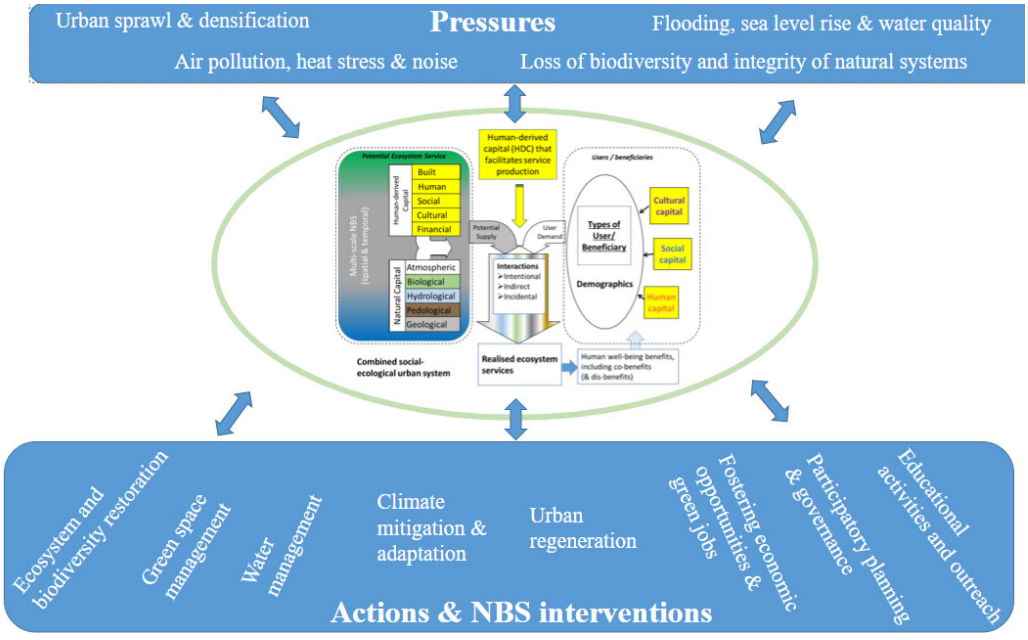
| Report on assessment of drivers & pressures leading to urban challenges | | |
|---|---|---|
| **Activity** | Analyzing the differences and similarities between the EU and Chinese aspects of drivers and pressures of urban NBS while understanding what is their impact related to the possible implementation of various urban NBS. | |
| **Benefits** | Having a clear overview of spatial data and obtaining a clear visual representation of data (maps) seems to be one of the key elements in decision-making for urban planners. Seeing where are the pressures and deploying suitable solution. | |
| **Needs addressed** | Cross-cutting analysis of European and Chinese cities has the potential for new learnings, especially considering the rate of urbanization. | |
| **Innovative potential** | Spatial data were analyzed in Regreen ULLs (cities) and their growth through the years with a correlation to the drivers and pressures of urban growth. | |
| **Competences** | Data analysis and usage of spatial data. | |
| **Stakeholders** | NBS urban planners, modelers, and researchers. | |
| **Location, timing** | Familiarization with urban pressures and planning NBS on multilevel governance (county, city, neighborhood). | |
| **Type of NBS** | The overall approach to all NBS. | |
| **Main conclusions** | The urban planning of NBS takes a multidisciplinary approach. To have a holistic approach it is necessary to connect various approaches by connecting drivers and pressures, the velocity of urbanization, and socio-economic and socio-demographic data with stakeholder preference to create appropriate ecosystem services on a neighborhood level. | |
| **Explore more** | Link | |
| **Contact point** | Toke Panduro | Leave your LinkedIn account here. |




< Figure 3: *Dynamic urban land cover expansion of the ULL Paris Region between 1985 and 2018.*

## Framework for NBS researchers

| The overarching framework for REGREEN | | |
|---|---|---|
| **Activity** | Providing methodology and structure for Regreen project to build upon. The framework was designed to capture and represent key components of Regreen project. | |
| **Benefits** | Creation of a novel approach to NBS exploration based on existing frameworks of successful NBS projects. | |
| **Needs addressed** | Regreen framework was built on the premise there is a general lack of co-production in other frameworks (not involving NBS end-users enough) and the complexity of mixing urban environments with green and blue spaces. | |
| **Innovative potential** | Our framework adequately recognises a combination of built and human capital with the active involvement of end users as active participants in shaping and forming services and benefits provided by NBS. | |
| **Competences** | A project team is needed for this activity to provide insights from each member's angle of expertise into the framework. | |
| **Stakeholders** | NBS researchers | |
| **Location, timing** | Starting or planning an NBS research project. | |
| **Type of NBS** | The overall approach to all NBS. | |
| **Main conclusions** | The experimental framework of Regreen proved if complexity is met with simplicity and co-creation, it provides human-centric and long-term results used by unsuspecting actors (such as schools, associations, city staff, private sector, and public bodies creating new collaborating opportunities). | |
| **Explore more** | Any links to the framework?; ReGREEN conceptual frameworks_proposed v4 | |
| **Contact point** | Marianne Zandersen | Leave your LinkedIn account here. |



## Factsheets_Best NBS cases on EU level

| Factsheets of State-of-the-art NBS | | |
|---|---|---|
| **Activity** | Listing best case practices of NSB covering diverse topics (from biodiversity to business activation). | |
| **Benefits** | Showcasing state-of-the-art urban NBS provides standards for the developers and urban planners of NBS to consider when building their NBS. | |
| **Needs addressed** | Inspiring a wider community of NBS experts from various sources (digital and live) in the format of 15 min read of the fact sheet to supplement readers with crucial text, pictures & SDG goals addressed by building their NBS project. | |
| **Innovative potential** | If best cases NBS are recognized nationally on the county level they can inspire local authorities and private stakeholders to undertake a similar NBS project development approach to create suitable NBS in their context. | |
| **Competences** | Creative thinking, networking, and an overview of the NBS market. | |
| **Stakeholders** | NBS providers and research community. | |
| **Location, timing** | Factsheets often can be conversation starters and set clear standards when establishing new NBS in the planning phase. Differences in approaches in NBS implementation can serve as a more creative approach to urban pressures and other urban challenges. | |
| **Type of NBS** | Various types of NBS | |
| **Main conclusions** | The creation of interactive material is crucial when promoting the concept of NBS. | |
| **Explore more** | Link | |
| **Contact point** | Daniela Rizzi | Leave your LinkedIn account here. |

# APPENDIX B - WP3 - MAPPING AND MODELING ECOSYSTEM SERVICES

## Guidelines for depaving and regreening strategy in the cities

| Guidelines for depaving and regreening strategy in the cities | | |
|---|---|---|
| **Activity** | Providing guidance to urban planners and local authorities for creating natural spaces in cities for the restoration of biodiversity and using it to solve urban pressures. | |
| **Benefits** | Providing guidelines for local authorities in process of city planning. Guidelines help create a map of the biodiversity potential and renaturing parts of the city as a measure of fighting against climate change. | |
| **Needs addressed** | Cities have many unused and brownfield areas that have the potential for hosting urban nature with correct planning and small measures, other existing areas can become areas of high biodiversity to compensate for land take. | |
| **Innovative potential** | Providing a step further from classical city landscaping and exploring possibilities of introducing nature in city areas. | |
| **Competences** | Ecologists, planners, and landscapers. | |
| **Stakeholders** | Local authorities. | |
| **Location, timing** | Urban planning. | |
| **Type of NBS** | Any type of NBS. | |
| **Main conclusions** | This guide provides simple enough methods and calculations that urban planners can use to reintroduce urban nature and connect it to urban dwellers. | |
| **Explore more** | Link | |
| **Contact point** | Gwendoline Grandin and Marc Barra | Leave your LinkedIn account here. |

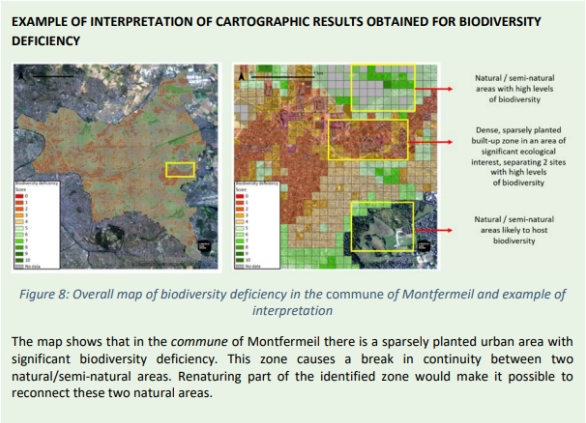
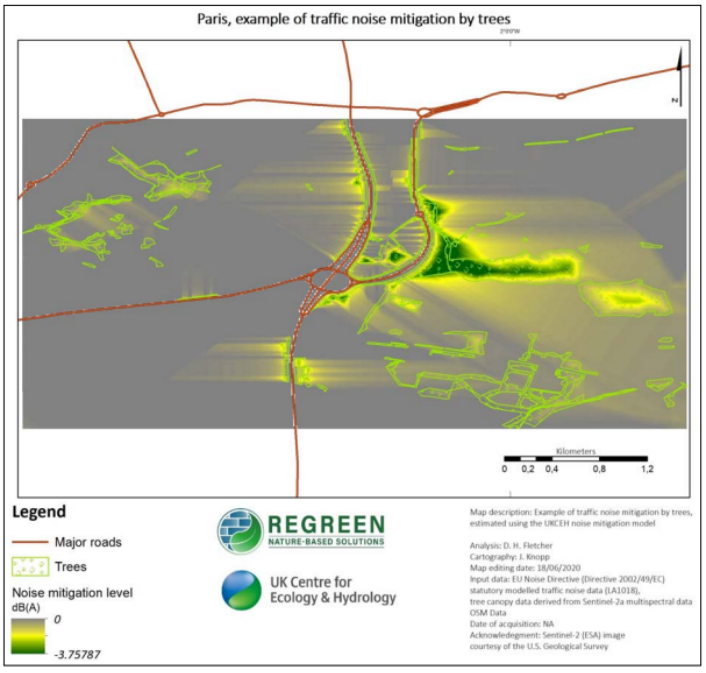



*Figure 8: Overall map of biodiversity deficiency in the commune of Montfermeil and example of interpretation*

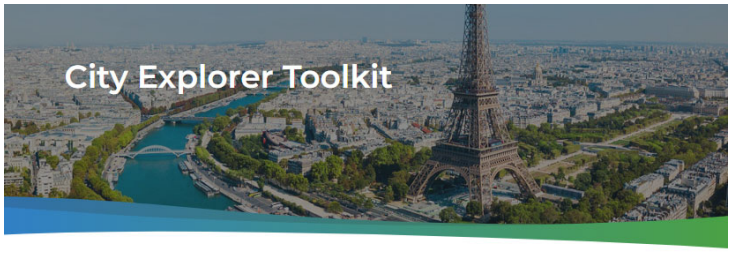
The map shows that in the *commune* of Montfermeil there is a sparsely planted urban area with significant biodiversity deficiency. This zone causes a break in continuity between two natural/semi-natural areas. Renaturing part of the identified zone would make it possible to reconnect these two natural areas.

## Report on Current datasets and their applicability of ecosystem services mapping and modelling

| Current datasets and their applicability to ecosystem services mapping and modeling | | |
|---|---|---|
| **Activity** | Exploration of what datasets are available for ecosystem service mapping and modeling in Regreen ULLs. | |
| **Benefits** | Having an overview of multi-state projects and dealing with various sources of datasets that are used in mapping and modeling. | |
| **Needs addressed** | Defining approaches to diverse sources of spatial data. | |
| **Innovative potential** | Some countries have more extensive datasets than others and finding similarities in existing datasets can offer multi-state research, hence obtaining better and richer datasets offers more accuracy in modeling phase. | |
| **Competences** | Data management and modeling experience. | |
| **Stakeholders** | Research community. | |
| **Location, timing** | Models of drivers, pressures, and ecosystem services are being developed within the Regreen project that is connected to spatial data. | |
| **Type of NBS** | Various types of NBS | |
| **Main conclusions** | Mapping and modeling will offer a visual representation of available data. Capturing historical changes gives a baseline for comprehension of changes in urban areas. | |
| **Explore more** | Link | |
| **Contact point** | Ellen Banzhaf | Leave your LinkedIn account here. |



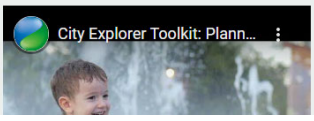
| City explorer tool | | |
|---|---|---|
| **Activity** | On-line modelling/mapping tool. | |
| **Benefits** | Better spatial planning of green and blue space (NBS) | |
| **Needs addressed** | Visualise and calculate multiple benefits provided by urban green and blue space (NBS); Help planners decide optimum locations for green and blue space placement; Explore scenarios of green and blue space in different locations; | |
| **Innovative potential** | A novel modelling tool that shows spatially-specific benefits from NBS at fine scale in cities | |
| **Competences** | Time to use the on-line tool, limited skills required | |
| **Stakeholders** | Planners; municipal authorities; | |
| **Location, timing** | Currently tool is set up for Paris, but can be extended to any city | |
| **Type of NBS** | The overall approach to all NBS. | |
| **Main conclusions** | The tool is currently in a Demonstration Pilot phase, but will be developed further, as part of REGREEN and other projects. | |
| **Web-link** | No web-link available yet | |
| **Contact point** | LJ@ceh.ac.uk | Google Scholar https://scholar.google.co.uk/citations?user=K1qMpYcAAAAJ&hl=en here. |




Home > City Explorer Toolkit

## City Explorer Toolkit

The City Explorer Toolkit is an interactive web-based tool, which helps planners to understand where best to create urban green spaces such as parks and blue spaces such as ponds, to ensure that benefits such as cooling on a hot day, improved air quality, and noise reduction are received by the people who need them most.



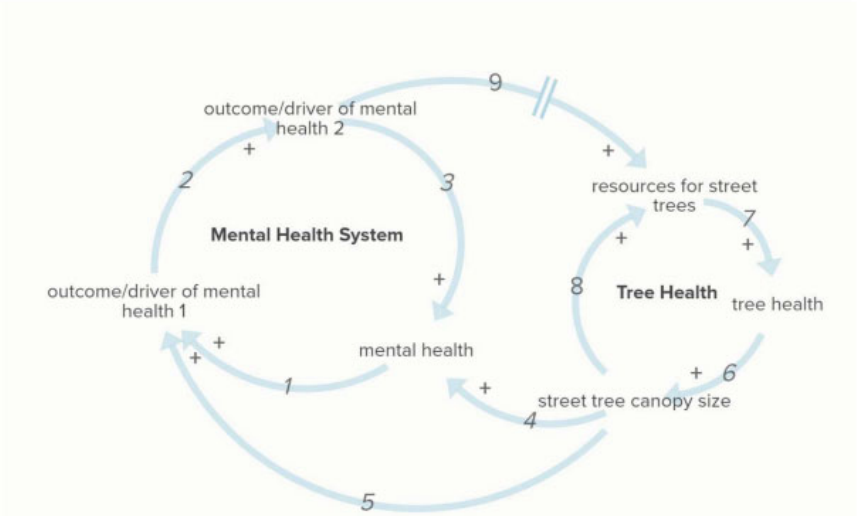

### Planning sustainable cities

Watch our video, which explains how our City Explorer Toolkit allows city officials to

# APPENDIX C - WP4 - WELLBEING ASSESSMENTS AND VALUING BENEFITS OF NATURE BASED SOLUTIONS

## NBS benefit valuation using casual loop diagrams

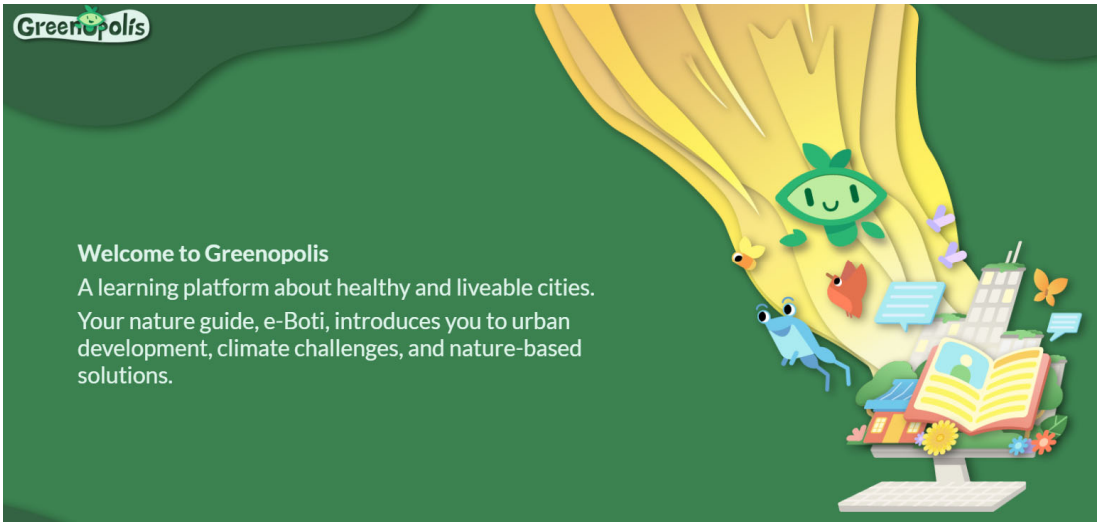
| Benefit valuation of NBS using casual loop diagrams | | |
|---|---|---|
| **Activity** | Using the research method of casual loop diagrams to uncover the benefits of NBS. | |
| **Benefits** | Synthesizing complex interrelationships between NBS (street trees) and benefits they bring to mental health. | |
| **Needs addressed** | A defining novel approach to diverse sources of data. Drawing connections when reviewing the literature. | |
| **Innovative potential** | Scientific synthesis and drawing conclusions are skills of researchers that will develop an understanding of NBS in urban areas. | |
| **Competences** | N/A | |
| **Stakeholders** | Research community. | |
| **Location, timing** | Exploring new ideas or concepts. | |
| **Type of NBS** | Various types of NBS | |
| **Main conclusions** | Causal loop diagrams proved to be a useful tool for understanding complex interrelations between street trees and mental health. | |
| **Explore more** | Link?? | |
| **Contact point** | Miriam Alvarado | Leave your LinkedIn account here. |



# APPENDIX D - WP5 - EDUCATION, PARTICIPATION AND AWARENESS

## Greenopolis educational platform

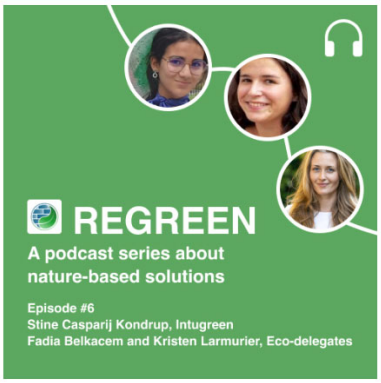
| Greenopolis | | |
|---|---|---|
| **Activity** | Setting up an educational platform for children. | |
| **Benefits** | The educational NBS platform empowers teachers to enrich their curriculum with elements of play, exploration, and research. | |
| **Needs addressed** | The educational platform can be a supplement to the education of kindergarten and elementary school. | |
| **Innovative potential** | The platform was translated and used in EU countries. | |
| **Competences** | Basic digital education is needed to use the platform for educational purposes. | |
| **Stakeholders** | Education, NGO sector | |
| **Location, timing** | Having creative and digital explanations helps teachers to expand their teaching methods, using exploration and play. | |
| **Type of NBS** | Different types of NBS. | |
| **Main conclusions** | The educational platform is in starting phase of usage in European ULLs. More concrete conclusions can be expected as Regreen project develops. | |
| **Explore more** | https://greenopolis.regreen-project.eu/ | |
| **Contact point** | ???? | Leave your LinkedIn account here. |



# APPENDIX E - WP8 - INNOVATION AND IMPACT CREATION

## Podcast series

| Regreen podcasts | | |
|---|---|---|
| **Activity** | Conveying interviews with NBS experts on various topics in the format of podcasts. | |
| **Benefits** | Presenting the diversity of experts needed in the field of NBS and their field of interest with what they have to offer to the wider community. | |
| **Needs addressed** | Bringing closer the best ideas and approaches to NBS, urban challenges, and objectives of Regreen project to the wider community. | |
| **Innovative potential** | N/A | |
| **Competences** | Storytelling. | |
| **Stakeholders** | All | |
| **Location, timing** | Online | |
| **Type of NBS** | General on the topic of NBS. | |
| **Main conclusions** | Podcasts offer alternatives to the textual format of information and offer information to the audience without reading. | |
| **Explore more** | https://www.regreen-project.eu/resources/ | |
| **Contact point** | ???? | Leave your LinkedIn account here. |




**Episode 6: Kids and nature learning - how young people can be involved in the regreening of our cities**

**"The more kids are involved as young, the more they can do"**

Why is it important to involve kids and young people in making our cities green and welcoming? And how do we do it?

In this episode, Stine Casparij Kondrup from Intugreen explains why it is important to engage young people in the process of sustainable urban development. She is joined by elected eco-delegates Kristen Larmurier and Fadia Belkacem who share their experiences and thoughts on the subject from their high school in Paris.

00:00 00:00

## APPENDIX F - TEMPLATE OF DECISION SHEET

| **Logic behind** | **Enter the title of your activity** | | |
|---|---|---|---|
| *What?* | **Activity** | Type what is your activity/intervention type? (e.g., workshop, mapping, website creation, education, etc.) | |
| *Why?* | **Benefits** | State benefits of repeating your activity. Aim for at least 2 – 5 benefits. | |
| *Why?* | **Needs addressed** | Type what needs does your activity to resolve. Aim for 3-5 needs. | |
| *Why?* | **Innovative potential** | State innovation that happened in your activity (up to 3 sentences). | |
| *What?* | **Competences** | What skills should people have that are engaged in your activity? | |
| *Who?* | **Stakeholders** | State who should repeat activity/who can carry out the activity/who else is needed to succeed in making it happen. | |
| *Where?* | **Location, timing** | Where did it happen? Where it should happen next? | |
| *What?* | **Type of NBS** | Choose an item. | |
| *When, where and why?* | **Main conclusions** | Insert up to 5 sentences of main conclusions, the next steps, and finishing thoughts. | |
| *Where?* | **Web-link** | Insert web links to relevant content if any (e.g. pictures, videos, tools, maps, databases, reports …), please upload to Aarhaus drive, or your own. Rename the document that you are uploading to WPx , Title of activity.doc, and link it here. | |
| *Where?* | **Contact point** | Leave your name and e-mail address here. | Leave your LinkedIn account here, or other relevant link. |

Note: *remember to add picture, video or visual materials