REGREEN
NATURE-BASED SOLUTIONS

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

Deliverable N°2.2.

NBS Knowledge Base Collective Report

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WP N°2 Challenges and nature-based solutions

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1 INTRODUCTION

1.1 Purpose of the Document

The document serves the purpose of describing in detail the mechanism behind finalising 14 fact sheets for the WP2, **Deliverable 2.2**, Task 2.3 (led by ICLEI Europe). It also gives a glimpse into the processes undertaken to not only finalise the fact sheets but also provide feedback to Oppla to improve the functionality of the case study compendium on the platform.

This deliverable centres around the production of 14 fact sheets covering 11 NBS-related topics, which will be largely disseminated via the REGREEN and Oppla websites to ensure availability, accessibility and utilisation of the knowledge extracted by the REGREEN project to the NBS community and the wider audience. The assessed information from a meta-review of about 300 cases on Oppla helped select case studies which illustrate good practices according to predefined criteria which was then concisely summarised and put into fact sheet format. The final fact sheets have been built upon the expertise present in the REGREEN consortium on several different topics such as education for and with NBS, impact of NBS on health and wellbeing, NBS and business opportunities, flood mitigation and coastal resilience, to name a few. Hence, the fact sheet topics were aligned with the REGREEN's WP leads, building from their expertise and experiences and in line with the grant agreement task description, which explicitly mentions the various WPs and their interlinkages.

In REGREEN's Grant Agreement, several potential formats were mentioned to showcase the collected knowledge (e.g. fact sheets, guidelines, infographics, checklists, templates), which should also be disseminated externally via the project website. In line with the work package structure of the REGREEN project, the following main topics were initially identified:

a) Social, economic, technical, managerial and financial good practices, enabling factors and barriers for design, construction, deployment and monitoring of NBS for restored and newly created ecosystems (All WPs);
b) Successful factors leading to capitalisation of multiple benefits / co-benefits of NBS (WP4);
c) Cost-effectiveness factors of NBS (WP2 and WP4);
d) Approaches to enhance human health and well-being through NBS (WP4);
e) Approaches of combining urban NBS with educational outreach (WP5);
f) Methodological approaches of NBS co-creation (co-planning, co-design, co-implementation and co-monitoring) (WP6 and WP7);
g) Relevant knowledge platforms on NBS and their potential to support ULLs to enable ecosystems to deliver their services for more liveable, healthier and resilient cities (WP7);
h) Enabling and hindering factors for making a business and investment case for NBS (WP8).

Hence, it is evident that this deliverable has been closely interlinked with the work being done in all WPs in REGREEN taking into account the different areas of expertise.

ICLEI team's initial task was to agree on the content to be covered and to find the best format to showcase it. After several project meetings and exchanges, REGREEN partners co-defined a set of 11 NBS-related topics that were relevant for the project, for which the ICLEI team would identify inspiring practices and cases. The partners, specifically the leads of all WPs, acted as topical leads for

the selected topics, helping out with the first phase of co-identification and co-definition of a criteria set for determining good practices from a meta-review of grey literature and more concretely of the cases within the Oppla platform. This supported the selection process of interesting cases with good practices in each of the topics.

1.2 Scope of the Document

There was some realignment and adjustment done of the main topics included in the grant agreement (as mentioned above) for **Deliverable 2.2**. After discussions with the topical leads, the following 11 topics were selected, to reflect the main themes in REGREEN: Biodiversity; Governance; Health and Wellbeing; Education; Water Quality Improvement; Flood Mitigation; Noise Mitigation; Heat Mitigation; Air Quality Improvement; Business Activation; and Urban Design Elements. This is not an exhaustive list of NBS related topics, but covers quite a bit of ground in supporting the understanding of the benefits and co-benefits that NBS promises to deliver on. A total of 13 cases were selected to illustrate good practices within the mentioned NBS-related topics, and one fact sheet portrayed the co-production process around the delivery of the fact sheets:

- The REGREEN Fact Sheets - From Start to Finish
- Pollinator-Friendly Food Forest in Dortmund (Biodiversity)
- Living Landscapes in Edinburgh (Biodiversity)
- Green Roof Strategy of Hamburg (Governance)
- Thamesmead Nature Forum of London (Governance)
- Farfalle in Tour Project of Turin (Health and Well-Being)
- "Let's make our school a growing place" Project of Santhiá (Education)
- Gorla Maggiore Water Park (Water Quality Improvement)
- The Reduna Project in Almada (Flood Mitigation)
- Green Noise Barrier of Sachsenheim (Noise Mitigation)
- Biotope City Vienna (Heat Mitigation)
- Green Corridors in Stuttgart (Air Quality Improvement)
- RICHWATER®, Reclaimed water for irrigation Malaga (Business)
- Green Living Room Ludwigsburg (Urban Design Elements)

All fact sheets can be assessed on the REGREEN's website.

Apart from the contextualising fact sheet, the others were structured according to the following sections:

- Sustainable Development Goals
- Objectives
- Description
    - Description of the NBS
    - Location
    - Quantitative/Qualitative data
    - Governance actions
    - Financing
- Challenges

- Opportunities
- Lessons learned
- Inspiration for others
- Further information

2 Methodology for the Co-Production of the REGREEN Fact Sheets

For the development of the fact sheets, several simultaneous, overlapping and iterative processes were established. Each one will be discussed in detail below. Please note that the subheadings give a glimpse of the chronological order in which the activities took place but these were not standalone nor linear but rather dependent on several feedback loops and intertwined processes.

An internal workflow document (**Annex I**) was set up to ensure the work plan and the systematisation of the entire process and a controlling sheet (**Annex II**) helped navigate towards the end goal of delivering 14 inspiring NBS fact sheets. Further, a detailed spreadsheet was created to systemise the capture of the data collected from the screening of the Oppla Platform NBS cases **(Annex III)**. The potential feedback email to Oppla shows our intention to provide detailed feedback to them (**Annex IV**). A sample questionnaire (**Annex V**) shows the level of detail of the conducted questionnaires, which led to follow-up interviews. **Annex VI** shows the Consent Document signed by the case owners for REGREEN's surveying work via questionnaires and interviews. And finally **Annex VII** contains all 14 fact sheets, which are the main output of this deliverable.

2.1 Fact Sheet Co-Production Process with Support of REGREEN's Topical Leads

Topical leads were identified within the REGREEN project due to their expertise in the different fields related to NBS. Guiding questions were formulated for each topic in agreement with the topical leads to guide the selection of cases which were seen as particularly inspiring out of the 300 Oppla cases, and the subsequent questionnaires and follow-up interviews with the case study owners. Several email exchanges and virtual meetings were conducted among REGREEN experts to agree on a set of 11 NBS-related topics that were relevant for the REGREEN project and to co-design the structure of the survey and interviews to be run with the case owners.

2.2 The Oppla Platform as a Sample Frame for the NBS Cases

Oppla, which is regarded as the principal EU repository for NBS cases, was chosen as the platform for assessing case studies. The Urban Nature Atlas was also considered, but due to the importance of the Oppla platform within the NBS European landscape, the limited time frame of the task and a high number of cases to screen through (approximately 300), the ICLEI team focused on the latter, engaging in early communications with the Oppla team. From the beginning it was clear that feedback on the user-friendliness of the platform would be useful for the Oppla team and for the wider NBS community.

Once it was established that the Oppla platform would be the sample frame to extract inspirational cases, a detailed spreadsheet with many filters was created to carry out the meta-review. The spreadsheet took into account REGREEN's existing Urban Living Lab Scoring Exercise and other similar

projects' classification efforts realised by project partners. A pilot study of 15 cases was done to check suitability of the different cells and filters of the spreadsheet, and adjustments were made accordingly. Most information was taken from the Oppla platform but the need for additional information and clearer classification criteria led to new cells.

After the pilot study, the actual work of reviewing the Oppla cases was carried out over about 7-8 months. During this time, a separate word document was maintained in which all limitations and shortcomings to finding essential information sufficient to make robust fact sheets were registered. This was then discussed with Oppla in virtual meetings.

The final spreadsheet with a detailed explanation was sent out to the Oppla team providing valuable feedback to the platform's case database, suggesting for example new filters to facilitate case searches and interlinking the SDGs to the work carried out within the Oppla cases

2.3 Showcasing "Inspiring practices" - Case Selection Process, Questionnaires, Interviews and Feedback Loops

Throughout the literature meta-review, the ICLEI team has identified those cases which presented inspiring practices in terms of the 11 NBS-related topics. Because not all topics were covered by the existing Oppla cases, there was a drive to supplement the information required by contacting specific case owners which ICLEI knew from previous engagements, ongoing projects, and existing knowledge about the topic(s). For instance, considering that ICLEI has worked with the City of Turin in the ProGIreg project, it was evident that the city had an interesting case on health & wellbeing, which had a great potential to be highlighted in the fact sheets and added to the Oppla platform.

Once the new cases were identified, ICLEI contacted the case owners, who demonstrated interest in being featured in the REGREEN fact sheets and were therefore open not only to answering detailed questionnaires and scheduling in-depth interviews, but also to reviewing the fact sheet's formulations. The "new" case owners were also invited to upload their cases to the Oppla platform. In this way, the gaps in terms of availability of inspiring practices on specific NBS-related topics were filled.

2.3.1 Conducting Questionnaires and Interviews with Case Owners

Questionnaires specific to each topic were designed with guiding questions (some common and some topic-specific) which were sent for feedback to the respective REGREEN topical leads. The aim of the questionnaires (see sample in **Annex V**) was to enable appropriate data collection, both qualitative and quantitative, for conceptualising the fact sheets. The questionnaire was sent to each case owner for responses, followed up by interviews to clarify any open questions, agree on the provision of images, and obtain permission for the use of the obtained information. The interviews were helpful to enable collection of additional information missed out in the written form via the questionnaires and answering of new questions which emerged from the analysis of the responses.

2.3.2 Drafting Process of the Fact Sheets

After internal discussions and feedback loops with REGREEN partners, a concrete structure was set up for the fact sheets to capture the most relevant, interesting and essential information from the answered questionnaires and interview processes. A draft for each topic was prepared and shared with the case owners for review and inclusion/deletion of any parts as found suitable by them. Following the integration of the feedback from case owners, a second draft was sent to REGREEN partners and ICLEI colleagues for review to ensure quality check in terms of content and language. All the necessary edits and comments were incorporated and a final version of each fact sheet was prepared. In parallel, the finalised fact sheets were sent out to the designer for putting it together in a visually appealing layout and format to ensure easy readability, completing the production process of 14 fact sheets on NBS-related relevant topics.

3 CONCLUSIONS

The utilisation and dissemination of the 14 fact sheets were discussed in a session within the **REGREEN General Assembly** carried out 18 May 2021, in which REGREEN partners engaged, providing the ICLEI team with valuable ideas for larger dissemination in Europe and China. One of the ideas was translating the fact sheets into Chinese language for the purpose of strengthening NBS-knowledge sharing and exchange . Another idea was to feature the fact sheets in a REGREEN podcast focussing specifically on the SDGs addressed by the described NBS cases. ICLEI Europe will definitely build on the collected ideas to ensure wider dissemination and utilisation of the knowledge featured in the fact sheets.

Through the co-productive process applied throughout the fact sheet elaboration, it was learnt that many valuable processes can emerge from the engagement with different partners, contributing to a more interdisciplinary final product.

The feedback provided to Oppla suggesting re-adjustment of the platform's searching filters and creation of new filters to facilitate usability of the platform has been a valuable output of REGREEN's Task 2.3. For instance, the ICLEI team recommended the inclusion of a SDG filter to the platform, considering that all the cases contribute to the achievement of SDGs in one way or another.

The ICLEI team is committed to using the fact sheets to support and inspire other potential cases on NBS planning and implementation across H2020 projects, taking into account the various topics that emerge from the nexus between NBS and their benefits and co-benefits. The fact sheets will not only be disseminated via the REGREEN project, but also via the Oppla and the NetworkNature platforms, honoring the time that case owners have invested in answering to the questionnaires and participating in the interviews. Not to forget mentioning, the journey of reaching this deliverable is a key output in itself, as the applied co-production process was indeed more complex than it would have been if the ICLEI team would have worked behind desks, but ensured interesting cross-cutting discussions with topical experts and case owners, contributing to the success of the final outcome.

3.1 Main Lessons Learned from the analysed cases

There are a number of lessons learned and tips that the ICLEI team has filtered from the questionnaires and interviews. Two biodiversity cases were analysed: the pollinator-friendly food forest case from Dortmund and the "Living Landscapes" case from Edinburgh. Both cases have shown the relevance of making the wider community aware of the benefits of biodiversity. In Dortmund, the case owners recommended public campaigns to communicate the potential benefits of an urban food forest and the close contact with local permaculturists. This case shows that the establishment of local organisations to outline a communication strategy and organise local events and workshops is key to fostering the involvement of the local community. Similarly, in the scottish "Living Landscapes" project, communication was just as important to enable the wider public to understand the benefits of biodiversity-friendly landscape management. Various public engagement and consultation processes were carried out, seeking involvement of "Friends Groups", community groups, schools, and individuals. Furthermore, the training of technical staff was an important factor to increase the green areas maintenance expertise.

Within the two cases on NBS and Governance, one from Hamburg (Green Roofs Strategy) and the other from London (Thamesmead Nature Forum), it was evident that when trying to implement an

NBS strategy, cross-departmental collaborations are very valuable and in fact necessary. In Hamburg, the need for addressing target groups in an adequate manner with regular meetings was seen as the key to ensuring uptake of NBS however, in the case of London it was clear that such a process of co-design is not so straightforward and simple as the general public is essentially time-poor. Hence, there was a suggestion to start paying the core members, meaning the most active citizens, for their time who are the actual driving force behind the planning, design and implementation of NBS. Identifying, networking and working with champions and future leaders by engaging a diverse group of stakeholders was also seen as an essential component of community engagement and good governance in London.

Considering the case on health and well-being from Turin, interdepartamental exchange within the municipality was key to enable the implementation, management and maintenance of the project to run smoothly. From the start of the project, different municipal departments and public bodies were included. Another essential element was to ensure the involvement of multiple stakeholders ((e.g. neighbourhood and environmental associations, city districts, urban farmers) and to encourage them to take ownership of the project' activities, whilst involving them, particularly citizens and students, in disseminating insights and taking part in citizen science actions. This enabled the strengthening of local networks and provided opportunities for people with the same aim to be connected to build a healthier and more viable city, allowing actors to come out of isolation by sharing experiences and skills with other stakeholders. Similarly, the educational project "Let's make our school a growing place" also highlighted the importance of reaching out and collaborating with local authorities, colleagues and school staff. It also underlined that captivating and engaging activities for young pupils is of utter relevance to make them get inspired and apply a 'learning by doing' approach towards nature-based solutions.

Manifold lessons learned could be extracted from the Gorla Maggiore case, whose nature-based solutions showed an equally efficient or even better technical performance than the alternative grey infrastructure. From the obtained results, a further lesson learned was that for similar costs, the use of green infrastructure ensured not only a good performance in terms of water purification and flood protection, but clearly provided additional benefits such as wildlife support and new recreational opportunities. From this case it became clear that nature-based solutions are highly effective for the restoration of riparian areas, wetlands and floodplains to retain water, because they can also support biodiversity and soil fertility whilst preventing floods and droughts. A clear recommendation from the contact points of the Gorla Maggiore case is that it is relevant to consider the manifold ecosystem services provided by nature-based design from the early stages of decision making.

The Reduna case from Almada showed the importance of aligning the project with regional/local strategies and policies. When the nature-based dune restoration for coastal protection became recognised in the Regional Coastal Management Plan, it was possible to apply for proper funding of the measures. Regarding the project implementation itself, a lesson learned was that ecological restoration, when properly designed and implemented, is rather invisible, and therefore, the intangible values of biodiversity are usually not immediately recognised. So the tip is to make the landscape restoration changes visible via public awareness and communication campaigns and arrive at a design that is appraisable by the visitors. It is also important that this typology of NBS is supported throughout by a strong technical and scientific staff, so that the measures to be implemented get continuously adjusted to the territory, from the environmental factors influencing the coastal dynamics and its vulnerabilities to the continuous monitoring works.

The noise barrier case from Germany was made possible by the political support garnered at the time of decision-making. In the country, the decision for constructing noise barriers has to be taken

before developing new housing areas or individual residential complexes. Therefore, such a nature-based product has an easy entry point. It is also important to note that a water supply for irrigation is ensured from the beginning, e.g. by using rainwater, contributing to the urban water cycle and actively reusing stormwater in a sustainable way. Another element which comes into play is the acquisition of a professional maintenance service from the start to ensure consistency in the multiple purposes of the green noise barrier, in terms of providing a habitat for birds and insects, regulatory ecosystem services like cooling as well as noise mitigation itself.

The Biotope City project from Vienna showed the importance for quality control, as many issues can emerge between the design and the construction phase. It is therefore crucial to keep track of the processes and to ensure that information is not being lost between implementers and participants throughout the construction phase. It has also proved very useful to have a coordinator for the entire project team who kept an oversight of tasks and involved players. Often the city department responsible for developing such a project does not engage with the maintenance department who is always thinking about saving maintenance costs. So good inter-departmental communication is key. Last but not least, municipalities and investors need to understand that the relevance of the planning process itself should be properly recognised and be provided with the necessary resources: the built structure will last a hundred years, so taking time to properly plan everything is key.

The case of the green corridors of Stuttgart focuses on the improvement of the city's air quality. The case shows that it is important to focus on the reduction of emissions (e.g. fewer vehicles, low emission cars), but it is key to provide better ventilation through cold air flows that can support the dilution of pollutants. Also, high-quality basic data and information is needed to convince the city planners first and subsequently have a basis on which to showcase planning and implementation needs towards the city council.

Malaga's experience with the Richwater project shows that while the technology and knowledge to implement projects using reclaimed water is already available, acceptance from the public and health authorities is still a determining factor. Support from local government and farmers should also be considered from the outset of the project. As such, a bottom-up approach with the participation of all actors in the value chain is essential for implementation success. On top of that, there is a lot of bureaucracy associated with obtaining water reuse permissions and the procedures and competences of relevant authorities are sometimes unclear. When designing an innovative device, it is key to prepare a strong and comprehensive business model, putting special emphasis on the value proposition and clearly quantifying the return on investment, especially the financial return and other social-environmental impacts. The financial aspects of the solution are crucial to convince stakeholders, especially potential investors.

Finally, the experience with the Green Living Room from Sachsenheim has indicated that an early engagement with the city's education department would have facilitated the promotion of school trips to the structure for children to learn about the multiple benefits that arise from providing nature-based solutions within city centres. Another lesson learned is that it would have been advantageous to engage nature conservation groups from the beginning of the planning process to ensure their buy-in and related dissemination of biodiversity net-gain opportunities and co-benefits. Finally, it would have been interesting to systematically monitor the cooling effect of the structure throughout the years, and compare it to other urban green structures in terms of microclimatic performance, making a report of how the Urban Living Room performs during the different seasons. This case highlights the importance of NBS monitoring processes and application of indicators to assess performance of implemented solutions. The replicating potential of solutions can be unfolded by disseminating evidence-based information on the efficiency of the measures.

ANNEX I - Fact Sheet Workflow

Workflow: Weekly timeline for the completion of REGREEN's Task 2.3
(SU, RRV, DR and SKO refers to ICLEI staff working in this task)

- WEEK 46: RRV generates a Workshop Folder within our Regreen WP2 Folder. We will put everything related to the workshop into this folder.
- WEEK 46: Discuss the 11 questions for the design of the workshop templates - RVV f*inds 1 hour slot for SU, RRV, DR*
- WEEK 46: DR puts together templates for Mural in Illustrator to present in meeting of week 47
- WEEK 46: DR asks Ellen for a URP 2020 registration list and writes to the consortium to pitch our workshop
- WEEK 46: DR coordinates with Vasilis the URP 2020 registration process of all of us
- WEEK 46: RRV puts together the list of remaining OPPLA cases (with links)
- WEEK 46: SU and RRV - continue to add the missing Oppla cases to our spreadsheet
- WEEK 47: Internal script of the URP workshop and preparation of slides - SU completes and presents on the weekly joint slot. RRV *finds 1 hour slot for SU, RRV, DR*
- WEEK 47: SU and RRV - continue to add the missing Oppla cases to our spreadsheet
- WEEK 48: Week of URP 2020, Day of the event November 24th from 15-17. RRV *finds a 30 min slot after the event for SU, RRV, DR*
- WEEK 48: SU prepares a one-pager text about the workshop to present in the following week - thinks about audience, potential communication channels (maybe Regreen Newsletter?).
- WEEK 48: SU and RRV - continue to add the missing Oppla cases to our spreadsheet
- WEEK 48: Each topical lead (SU, RRV, DR) ranks their favorite "star cases" for themselves (maybe 2 for each and adding why?). Each starts drafting a questionnaire related to the topics (strengths) to discuss in the meeting of week 49. RRV, please complete here the list of leads for the 11 topics:
    - Governance, Health, Education and Noise / Responsible: Shreya Utkarsh
    - Biodiversity, Heat, and Air Quality / Responsible: Roger Roca
    - Business, Flood Mitigation, Water Quality and Urban Design Elements / Responsible: Daniela Rizzi
- WEEK 49: RRV *finds a 1,5 hour slot for SU, RRV, DR.* We discuss the:
    - STAR CASES (preferred ones by "topical lead SU, DR, RRV");
    - The questionnaire (common questions? # questions?).
    - A strategy to contact the responsible staff for star cases.
    - We set up a deadline to get the questionnaires back and slots for reminders.
- WEEK 50: Until December 10th all cases covered (Oppla Platform)
- WEEK 50: DR Prepares email to Oppla with our spreadsheet and strategy how to deal with it. We can discuss this in the weekly slot of week 51.
- WEEK 50: Final draft of the questionnaires submitted to Laurence (WP lead). RRV *finds 1 hour slot for SU, RRV, DR*
- WEEK 51: Submission of the 11 questionnaires to the contact points with the deadline of **28th Jan 2021**; and a deadline of **January 15th to get feedback from the experts**. The Doodle should be set for WEEK 5. Mornings from 10 to 12.
- WEEK 52 to WEEK 1: Out of office / Holidays
- WEEK 2: RRV sends a reminder to all 11 contact points.
- WEEK 3: All back to the office - RRV *finds 1 hour slot for catch-up SU, RRV, DR*
- WEEK 4: Deadline of the questionnaires January 28th. Each topical lead checks the responses to questionnaires and schedules follow-ups if necessary. Discussion of the next steps - *RRV finds 1 hour slot for catch-up SU, RRV, DR*
- WEEK 5: 11 INTERVIEWS with case contact points

- Configuration of the formats in which we will present the gathered information - *RRV finds 1 hour slot for catch-up SU, RRV, DR*
- WEEK 6: DR is out of office from Feb 10 to 12. SU starts with a suggestion of template for Deliverable 2.2 (using REGREEN's template as basis). We all discuss a strategy to fill into the document and create fact sheets. RRV *finds 1 hour slot for catch-up SU, RRV, DR* - From Grant Agreement: D2.2 Report on important aspects of existing successful NBS, incorporating fact sheets and guidelines (M20, ICLEI)
- WEEK 7: fact sheet structure - draft
- WEEK 8: Create a template for the fact sheet (Google Docs)
    - RRV/SU/DR - mirroring of docs to I:Drive
    - All: start reviewing the info from the interviews/questionnaires; check if more images are needed (make sure there are copyright issues)
    - DR will write to SKO about timeline
    - Oppla - draft email (to be sent Week 9)
- WEEKS 9-13/14: fact sheet production - First round - 1st package 6 fact sheets were sent out (3 RRV and 3 SU)
- WEEK 15: 6 fact sheets feedback rounds / Completion of 4 new ones (1 RRV, 1 SU, 2 DR)
    - 1st package (with 6 fact sheets): Deadline April 16th to receive feedback from case owners! OK!
    - 2nd package (additional 4 fact sheets - 1 RRV, 1 SU, 2 DR) **send out May 20th**
- WEEK 16:
    - Send out on **May 21st** the 1st package (6 first fact sheets) for review to REGREEN (Laurence) and ICLEI (Alice) with deadline of May 5th
    - 2nd package (4 new fact sheets): send out to case owners for review with the deadline of May 3rd (May 5th the latest!)
    - 3rd package (additional 4 fact sheets): **complete until the end of this week!**
- WEEK 17:
    - 1st package (6 first fact sheets): time for ICLEI/REGREEN reviewers to process
    - 2nd package (4 new fact sheets): time for case owners to process - deadline May 3rd (May 5th)
    - 3rd package (additional 4 fact sheets): send out to case owners with deadline of May 14th
- WEEK 18:
    - 1st package: finalised and sent to SKO for design with a deadline of May 21st.
    - 2nd package (4 fact sheets): sent out for review by REGREEN (Sally, Laurence) and ICLEI (Alice) with the deadline of May 14th.
    - 3rd package (additional 4 fact sheets): time for case owners to process
- WEEK 19:
    - 1st package (6 first fact sheets): SKO works in the final design.
    - 2nd package (4 new fact sheets): send out to SKO for design with deadline of May 28th
    - 3rd package (additional 4 fact sheets): receive feedback from case owners (May 14th)
- WEEK 20:
    - 1st package (6 first fact sheets): delivery of final design by SKO on May 21st
    - 2nd package (4 new fact sheets): SKO works in the final design.
    - 3rd package (additional 4 fact sheets): send out for ICLEI/REGREEN for review with a deadline of May 28th
- WEEK 21:
    - 1st package (6 first fact sheets): send out to Marianne.
    - 2nd package (4 new fact sheets): delivery of final design by SKO on May 28th

    - 3rd package (additional 4 fact sheets): time for ICLEI/REGREEN to process
- WEEK 22:
    - 1st package (6 first fact sheets): OK!
    - 2nd package (4 new fact sheets): Send out to Marianne.
    - 3rd package (additional 4 fact sheets): receive feedback from ICLEI/REGREEN. Send it to SKO for final design. Deadline for SKO on June 11th.
    -
- WEEK 23:
    - 1st package (6 first fact sheets): OK!
    - 2nd package (4 new fact sheets): Ok!
    - 3rd package (additional 4 fact sheets): send out to Marianne.
- WEEK 24:
    - 1st package (6 first fact sheets): OK!
    - 2nd package (4 new fact sheets): Ok!
    - 3rd package (additional 4 fact sheets): Ok!
    - All 14 fact sheets finished! / Finalise Deliverable REPORT (DR, SU and RRV)
- WEEK 25: send to Marianne for uploading:
    - All 14 fact sheets + final report

- ***DEADLINE for DELIVERABLE 2.2: M20 (JUNE 2021), June 21st!***

REGREEN TASK 2.3 - OVERVIEW OF THE QUESTIONNAIRES/INTERVIEWS DESIGN PROCESS for the 11 NBS-related TOPICS

TOPICS	Name of the case	OPPLA Link	Contact Point of the case	Who contacted?	Responsible for the questionnaire	Already in the OPPLA platform or agreed to upload?	Questionnaire Status 10/12 - started / done / untouched	Experts for the topics who will give feedback to the questionnaire	Inputs / Criteria from experts: January 15th - YES/NO	Answers from contact points: January 28th - YES/NO	CONSENT FORM	CHOSEN DATE and who is participating (RRV, SU, DR)
Biodiversity (BIO)	Naturfelder association Food forest	https://oppla.eu/casestudy/21240 https://oppla.eu/casestudy/21617	Rolf	RRV	RRV	uploaded now! 2 new cases!	done (use it as basis for others)	Marc	No - Daniela will send Whatsapp to Marc	Roger will prefill the survey with Bettinas info	DONE	Thursday, February 4 · 11:30am – 12:30pm, RRV, DR, Rolf, https://us02web.zoom.us/j/85758416345?pwd=Y1EyMHE4b1J0U1p4U2F1dmoyd2Z4dz09
Biodiversity (BIO)	Living Landscapes	https://oppla.eu/casestudy/21288	Stephen	RRV	RRV	Agree to upload (ADD LINK!)	done (use it as basis for others)		No	He said he will do it on time, need to follow up. Ask for Oppla link.	DONE	Only Roger can schedule
Education (E)	Let's make our School a growing place!	? (Asked Enrica to upload case - 23 March) Oppla link?	Still to be added to Oppla!	SU	SU	Hasn't uploaded on Oppla	untouched - please add Oppla link!	Sally	Yes	Case will be uploaded on Oppla as well as Enrica is working on the Questionnaire.	DONE	3 Feb 10:30-11:30am SU, DR, Enrica https://us02web.zoom.us/j/89646369411?pwd=ZTVSQ01IL2dYemVuNDNLN1ZGcjBYQT09
Governance (G)		https://oppla.eu/casestudy/21469	Nicola	SU	SU	Added					DONE	ok
Governance (G)	Green Roof Strategy, Hamburg Thamemead Nature Forum, London	https://oppla.eu/casestudy/21219 (Justus) ()	Justus, it would be good to copy Mrs. Dr. Bornholdt	SU	SU	Uploaded now!	done	Bettina, Anne	Anne said she needs more time. Until 20th Jan.	Answer from Nicola-community forum. She will upload the case to Oppla until Jan 25th. Waiting for the survey. Shreya is in contact with Justus. Shreya will suggest slots in Week 6.	DONE	ok
Business (BU)	Use of reclaimed water in nature-based solutions	https://oppla.eu/casestudy/21253	Gerardo (Bioazul)	DR	DR	uploaded now!	done	Siobhan, Tim Taylor	Daniela will follow up with Tim	Antonia/Gerardo: busy with GDC. Daniela suggested 2 slots in week 6.	DONE	ok
Health and wellbeing (H&W)	Farfalle in ToUr	https://oppla.eu/casestudy/21250	Francesa and Simona	SU	SU	Uploaded now!	done	Ben	Yes - https://beyondgreenspace.net/making-the-most/making-the-most-of-green-space-for-peoples-health-case-studies/	Shreya will send a reminder for the questionnaire and the slot confirmation	DONE	https://us02web.zoom.us/j/83211782279?pwd=MVdmSU5iYkRwbi9JaFMxT0VoZDhhZz09
Heat (H)	Biotope City Vienna	https://oppla.eu/casestudy/21373	G4C - Flo	DR	RRV	Uploaded now!	done	Neil Bird	Already sent comments	Hopefully make it soon 3 days ago. Uploading + Questionnaire. Roger is following up.	RECEIVED!	Thursday, February 4 · 3:30 – 4:30pm, RRV, DR, Florian https://us02web.zoom.us/j/87817230139?pwd=bzk2eWlHWnFOY01yMkMvend6S1hkZz09
Noise (N)	Green Noise Barrier Sachsenheim	? (Asked Sven to upload case - 23 March)	PENDING - Please ask Laurence if he knows a good case	SU	SU	uploaded now!	done	Laurence	Yes	We are still lacking a case. Laurence will check if he finds a case. Shreya following up.	DONE	ok
Flooding (F)	Almada, Portugal	Oppla link? Asked on April 29	Nuno and Patrícia	DR	DR	Need to be uploaded	done	James Miller, Gianni	Yes - James	Vasilis has sent email on January 19th. Daniela will follow up.	DONE	ok
Water Quality Improvement		https://oppla.eu/casestudy/17252	Fabio Masi and Anacleto Rizzo	DR	DR	Already in Oppla	done	James Miller	Yes - James	Yes	DONE!	ok
Air Quality (AIR)	Green corridors: Ventilation corridors network, Stuttgart	https://oppla.eu/casestudy/21264	Rainer, Stuttgart	DR	RRV	Already in Oppla	done	Massimo Vieno	Wednesday-Thrusday comments will arrive / Roger is following up	He said he will do it on time, Roger will follow up	DONE	February 1st, RRV, DR, Rainer: https://us02web.zoom.us/j/84440792366?pwd=Vm1QVHNTdjA4VUwwSExYdTRTTVlFZz09
Urban design elements (UDE)	Green Living Room - Ludwigsburg	https://oppla.eu/casestudy/17555	Hans Müller	DR	DR	Already in Oppla	done	Doris	Ok	Call scheduled Jan 22nd with Daniela and Sven.	Received!	ok
ALL Cases Fact Sheet												

ANNEX III - Screening Cases Spreadsheet

Since it is difficult to show the overview of the wide spreadsheet used for the purpose of doing the meta-review, please see below the column headings, which were crucial for data collection from all the 300 screened Oppla cases.

- Name of the project
- OPPLA Link
- Type of case
- City, country
- Implementation period (year) OR starting date of the document
- Type of Ecosystem: Eggermont Classification
- Brief description
- Object type
- Object category
- Accessibility
- Main Function Scale
- Availability of Quantitative information
- Availability of Qualitative information
- Highlighted topics of the case
- SDGs being addressed
- Contact point

ANNEX IV - Oppla Feedback Documents

A package was prepared to give feedback to Oppla and provide the detailed spreadsheet highlighting REGREEN's contributions to the Oppla Platform. The "Read Me" tab of the NBS case spreadsheet explains what the spreadsheet is about and highlights potential contributions for the Oppla team and for the improvement of the Oppla NBS case platform. The addition of SDGs is probably the most valuable contribution from ICLEI's team.

Whereas working with the NBS cases and looking for updated successful cases on each of the REGREEN selected topics, the ICLEI team has activated many contact points to add their cases to the OPPLA platform. All together 11 new cases were added to the Oppla platform as a result of REGREEN's work:

- Naturfelder (biodiversity): https://oppla.eu/casestudy/21240
- Food forest: https://oppla.eu/casestudy/21617
- Edinburgh case (biodiversity): https://oppla.eu/casestudy/21288
- Hamburg Green Roof Strategy (governance): https://oppla.eu/casestudy/21219
- Thamesmead Nature Forum in London (governance): https://oppla.eu/casestudy/21469
- Let's make our School a growing place (Education): https://networknature.eu/product/22217
- Farfalle in ToUr case (health & wellbeing): https://oppla.eu/casestudy/21250
- Use of reclaimed water in nature-based solutions (business activation): https://oppla.eu/casestudy/21253
- BIOTOPE CITY - the dense city as nature (heat mitigation): https://oppla.eu/casestudy/21373
- Green Noise Barrier Sachsenheim (noise mitigation): https://oppla.eu/casestudy/21938

- Almada's Coastal Flood Mitigation Case 'ReDuna': https://oppla.eu/casestudy/22495

The cases on "urban element design", "air quality" and "water quality improvement" addressed in the fact sheets are the ones below, which were already described in the Oppla Platform:

- Green Living Room - Ludwigsburg (urban design element) https://oppla.eu/casestudy/17555
- Green corridors: Ventilation corridors network, Stuttgart (air quality improvement) https://oppla.eu/casestudy/21264
- Constructed wetlands as a multipurpose green infrastructure in Gorla Maggiore, Italy (water quality improvement) https://oppla.eu/casestudy/17252

ANNEX V - Sample of a Questionnaire for Data Collection

Sample Questionnaire - NBS and Health & Wellbeing

Interview to assess European highlighted NBS case in regards to Health and Well-Being

Contact details	
Name	
Role	
City, Country	
Organisation, Department	

Success in Health and Well-Being

In your opinion what are the main factors that have made your case successful in health and wellbeing with regards to NBS?

Project Profile

1. Name of the project
2. Please add the implementation period (year) OR indicate if it is an Analytical/Planning Document (Masterplan, Study, Assessment?)
3. NBS type (Type 1: Using existing ecosystems, Type 2: Modifying existing ecosystems to better deliver selected ecosystem services, Type 3: Creating new ecosystems)
4. Accessibility (private land; public land)
5. Please, indicate the SDGs being addressed by your NBS case in your opinion (SDG1: No Poverty, SDG2: Zero Hunger, SDG3: Good Health and Well-being, SDG4: Quality Education, SDG5: Gender Equality, SDG6: Clean Water and Sanitation, SDG7: Affordable and Clean Energy, SDG8: Decent Work and Economic Growth, SDG9: Industry, Innovation and Infrastructure, SDG10: Reduced Inequality, SDG11: Sustainable Cities and Communities,

SDG12: Responsible Consumption and Production, SDG13: Climate Action, SDG14: Life Below Water, SDG15: Life on Land, SDG16: Peace and Justice Strong Institutions, SDG17: Partnerships to achieve the Goal) For reference: https://www.globalgoals.org"

Specific Questions

1. How has COVID 19 impacted the health and wellbeing focus of your case in the city?
2. What do you consider is the relevance of health and wellbeing in the political agenda of your city?
3. How aware and involved do you think the citizens are regarding this issue? What do you think the reasons are?
4. Does your city have a health and wellbeing strategy or action plan? If there is not, are there any other policies on national or regional level that are relevant for it?
5. What is the characteristic of this strategy/policy – is it in the form of a handbook, guidelines, legally binding actions, set of recommendations, etc? And was your NBS case study aligned or not aligned with it?
6. Which departments work together on the topic of Health and wellbeing in your city?
7. Are there opportunities for multiple health benefits e.g. physical activity; stress reduction/rest and relaxation; social contact; risk reduction (e.g. floods)? If so, elaborate
8. Who are the target audiences for your case?

Actions

1. How did the collaboration between the project and the city work? Do you think it worked well?
2. Did you take measures to improve public information and participation?

Financing

1. Are financial instruments made available to the local/regional level for this purpose? If so, which ones?
2. Do you have an estimation of the implementation costs of this NBS element of health and wellbeing?

Monitoring Impacts

1. Is there a monitoring, reporting and evaluation system in place?
2. What is reported and at what frequency?
3. How is information evaluated and how are results used?
4. Did you consider in your project planning a combined effect coming from the application of different NBS (green roofs, green facades, street trees etc.)?
5. Could you already enumerate some quantitative results on health and wellbeing after the application of this NBS?

Barriers

1. What do you think were the main challenges that implementation of this NBS case faced (please consider categories such as lack of knowledge, administrative issues etc.)?
2. What resources do you feel are/were missing?

Enablers

1. What were the key enabling factors in place which led to successful planning and implementation of the NBS to improve health and wellbeing?

Transferability

1. Can your NBS case be replicated in other cities/regions within your country or even outside? What main processes and outcomes can be considered as transferable?

Recommendations

1. If you could give some recommendations to others engaging in improving health and wellbeing with NBS on city level (considering both the policy and implementation level), what would they be?
2. Can you refer to important lessons learnt from your experience on the health and wellbeing case?

ANNEX VI - Consent Document for REGREEN's Interviews

1. Information

The staff Dr. Daniela Rizzi, Shreya Utkarsh and Roger Roca Vallejo from the nature-based solutions group at ICLEI Europe have conducted questionnaires and follow-up interviews on nature-based solutions (NBS) and related good practices covering several topics (biodiversity, education, governance, business activation, health and wellbeing, heat mitigation, noise mitigation, flood mitigation, water quality improvement, air quality improvement and urban design elements) in the context of the research project "REGREEN – Fostering nature-based solutions for equitable, green and healthy urban transitions in Europe and China" under the Horizon 2020 grant agreement number 821016.

The questionnaires and interviews were conducted with experts and contact points from various organizations (local governments, civil society, politics, business, science) with the purpose to produce NBS-related fact sheets about the studied cases for wider dissemination to the wider public via the REGREEN website, the OPPLA Platform and ICLEI's networks and social media. Apart from the answers provided in the questionnaires and in the follow-up interview, the following personal data has been collected, processed and stored during the interviews.

• First name and surname

• function

• Professional address

• Professional email address

The interviews were recorded in video via the Zoom software, but ICLEI Europe has no intention of publishing these, as they were only conducted with the purpose to complete and amend the information already provided within the questionnaires to assure the accuracy of the information to be disclosed within the fact sheets. The name of interviewee and related professional address will only be published with the consent of the case's contact point, if there is interest to allow for people contacting them to know more about the case - similarly to what is provided on the Oppla Platform, see example here. A quote from the interviewee might be used within the fact sheet, which will be sent to the case owner for approval by email prior to any publication. The aforementioned personal data will not be processed for purposes other than those described and will not be passed on to third parties.

If the REGREEN project wishes to publish any future scientific publication making use of the questionnaire answers and interview texts, the case owners will be contacted again to give their permission. In any case, all information that could lead to an identification of the interviewed person will be removed from the text. Interviews would only be quoted in excerpts and without personal reference. This ensures that the interviewed person cannot be identified by third parties.

2. Consent of Use of Questionnaire and Interview Data:

☐ Yes, I consent to the processing of my personal data listed in section 1 above for the production of NBE-related fact sheets in the form of original sound recordings and transcripts of the interview for the stated purposes.

I am aware that these consents are voluntary and can be revoked at any time. A revocation, however, does not eliminate the legality of the processing retroactively, but only for the future. The revocation is to be addressed to:

by e-mail:
daniela.rizzi@iclei.org

or by post:
Daniela Rizzi
Leopoldring 3, 79098 Freiburg im Breisgau
Germany

After receipt of the revocation, the relevant data will no longer be used and processed or immediately deleted.

3. Consent of Use of Provided Pictures:

☐ Yes, I consent to the use of the provided pictures, stating the source accordingly, for the purpose of case illustration within the fact sheet.

I am aware that these consents are voluntary and can be revoked at any time. A revocation, however, does not eliminate the legality of the processing retroactively, but only for the future. The revocation is to be addressed to:

by email:
daniela.rizzi@iclei.org

or by post:
Daniela Rizzi
Leopoldring 3, 79098 Freiburg im Breisgau
Germany

After receipt of the revocation, the relevant data will no longer be used and processed or immediately deleted.

_____
Person interviewed (surname, first name in block letters; signature)

_____
Place, date

ANNEX VII - Main Output of Deliverable 2.2: REGREEN's Fact Sheets

The REGREEN Fact Sheets - From Start to Finish

Pollinator-Friendly Food Forest (Biodiversity)

Living Landscapes in Edinburgh (Biodiversity)

Green Roof Strategy of Hamburg (Governance)

Thamesmead Nature Forum of London (Governance)

Farfalle in Tour Project of Turin (Health and Well-Being)

"Let's make our school a growing place" Project of Santhiá (Education)

Gorla Maggiore Water Park (Water Quality Improvement)

The Reduna Project in Almada (Flood Mitigation)

Green Noise Barrier of Sachsenheim (Noise Mitigation)

Biotope City Vienna (Heat Mitigation)

Green Corridors in Stuttgart (Air Quality Improvement)

RICHWATER®, Reclaimed water for irrigation Malaga (Business)

Green Living Room Ludwigsburg (Urban Design Elements)

THE REGREEN FACT SHEETS - FROM START TO FINISH

REGREEN
NATURE-BASED SOLUTIONS

SDGs are incorporated in the cases depicted in all the fact sheets.

Image: Biotope City Wien /GREENPASS

> CONTEXTUALISATION OF THE REGREEN FACT SHEETS

This fact sheet gives an overview of REGREEN's journey in terms of processes, outputs and milestones to showcase 13 inspiring nature-based solutions applied case studies, covering the following topics: Biodiversity; Governance; Health and Wellbeing; Education; Water Quality Improvement; Flood Mitigation; Noise Mitigation; Heat Mitigation; Air Quality Improvement; Business Activation; and Urban Design Elements. Each fact sheet is linked below:

- Pollinator-Friendly Food Forest in Dortmund (Biodiversity)
- Living Landscapes in Edinburg (Biodiversity)
- Green Roof Strategy of Hamburg (Governance)
- Thamesmead Nature Forum of London (Governance)
- Farfalle in Tour Project of Turin (Health and Well-Being)
- "Let's make our school a growing place" Project of Santhiá (Education)
- Gorla Maggiore Water Park (Water Quality Improvement)
- The Reduna Project in Almada (Coastal Flood Mitigation)
- Green Noise Barrier of Sachsenheim (Noise Mitigation)
- Biotope City Vienna (Heat Mitigation)
- Green Corridors in Stuttgart (Air Quality Improvement)
- RICHWATER®, Reclaimed water for irrigation in Malaga (Business)
- Green Living Room Ludwigsburg (Urban Design Elements)

The context in which these fact sheets were conceptualised was a task of the REGREEN project, which entailed showcasing inspiring examples of NBS from cities around Europe to serve as a reference on NBS planning and implementation across REGREEN's activities. The fact sheets aimed to emphasise good practices, barriers and lessons learned. This process was carried out through a series of discrete steps:

- Agreeing among experts what constitutes 'inspiring practice'
- Agreeing scope and process for the assessment of NBS cases
- Questionnaires and interviews to describe NBS good practices
- Design of fact sheets

> AGREEING AMONG EXPERTS WHAT CONSTITUTES INSPIRING PRACTICE

The following main topics were identified as subjects for the fact sheets, which aligned to the focal areas of interest for REGREEN:

a) Social, economic, technical, managerial and financial good practices, enabling factors and barriers for design, construction, deployment and monitoring of NBS for restored and newly created ecosystems;

b) Successful factors leading to capitalisation of multiple benefits / co-benefits of NBS;
c) Cost-effectiveness factors of NBS;
d) Approaches to enhance human health and well-being through NBS;
e) Approaches of combining urban NBS with educational outreach;
f) Methodological approaches of NBS co-creation (co-planning, co-design, co-implementation and co-monitoring);
g) Relevant knowledge platforms on NBS and their potential to support ULLs to enable ecosystems to deliver their services for more liveable, healthier and resilient cities;
h) Enabling and hindering factors for making a business and investment case for NBS.

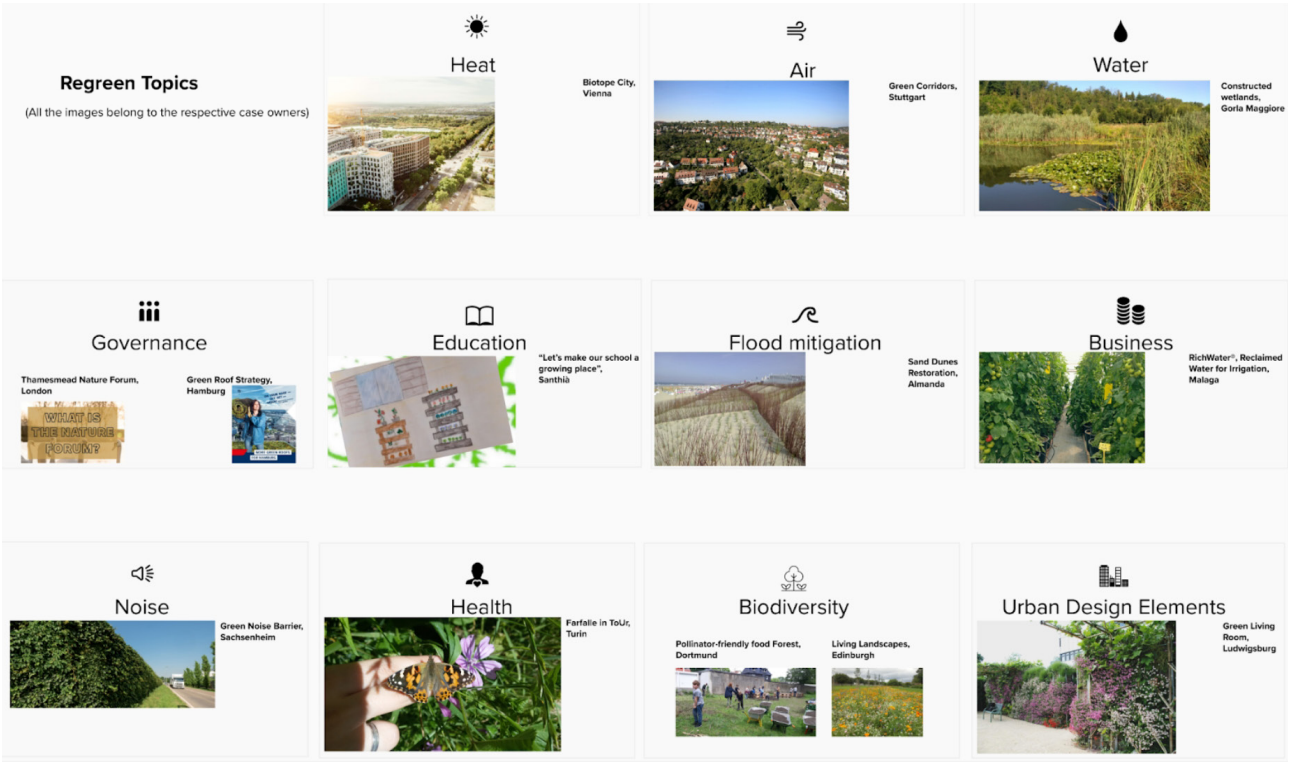
For each of these topic areas, a key initial task, led by ICLEI, was to work with experts across the REGREEN project to co-define what constitutes 'inspiring practice' in terms of nature-based solutions. Through this co-creation process, involving several project meetings and email exchanges, partners defined the set of NBS-related topics that were relevant for the project, and which subsequently make up the fact sheets.

For each topic, experts helped define several criteria for the following question: "*What would 'inspiring practice' look like?*" The criteria were then used as a basis to assess the NBS cases being reviewed, to provide an overall assessment, and to select the best examples for developing case study fact sheets. In addition to these criteria, other aspects such as identifying key enablers of success, and identifying potential barriers to implementation or reasons for lack of success, were also considered.

> AGREEING SCOPE AND PROCESS FOR THE ASSESSMENT OF NBS CASES

Before starting, the scope of the work to screen NBS cases was defined. Oppla, also regarded as the EU repository for NBS cases, was chosen as the platform for assessing case studies. The Urban Nature Atlas was also considered, but due to the importance of the Oppla platform within the NBS European landscape, the limited time frame of the task and a high number of cases to screen through Oppla (approximately 300), the team focused on the latter, engaging in early communications with the Oppla team. Where the project team found out about other important case studies, or where there were gaps in coverage

REGREEN TOPICS



against the REGREEN topics, other sources were drawn upon to supplement the information held in Oppla. For instance, considering previous work with the City of Turin in the ProGIreg project, it was evident that the city had an interesting case on health & wellbeing, which had a great potential to be highlighted in the fact sheets and added to the Oppla platform. Therefore, more than ten "new" cases were added to the Oppla platform as a result of REGREEN's work. In this way, the gaps in terms of availability of inspiring practices on specific NBS-related topics were filled.

To conduct the meta-review, a detailed spreadsheet with various filters was set up, taking into account the importance of each topic to REGREEN's Urban Living Labs and the data needs for those topics. In order to check whether the spreadsheet's cells and filters would cover all relevant information, a test drive with 15 cases was done to check its suitability. After iteration with REGREEN topic experts, adjustments were made accordingly to create clearer assessment criteria, and ways of scoring cases against these assessment criteria (available on the REGREEN website).

Throughout the meta-review of the Oppla platform, it was clear that not all selected NBS-related topics were covered by the existing Oppla cases. Therefore, there was a need to look for additional cases that presented inspiring practices. ICLEI contacted specific case owners which were known from previous engagements, ongoing projects, and existing knowledge about the topic(s).

The evaluation conducted during the review phase, and recorded in the spreadsheet allowed the selection of one or more case studies for each topic which best illustrated 'inspiring practice'.

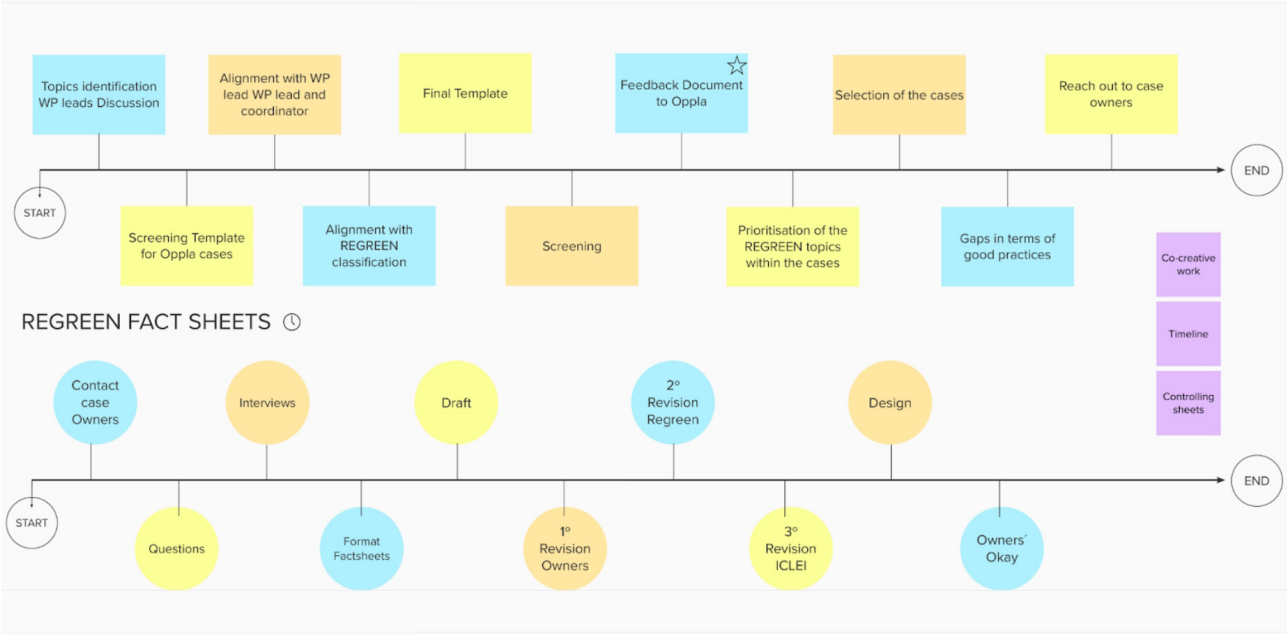
During the assessment review, a separate word document was maintained in which all limitations, challenges and shortcomings to finding essential information to make robust fact sheets were registered. This was discussed with project topic experts and with Oppla in virtual meetings.

From the beginning it was clear that feedback on the user-friendliness of the platform would be useful for the Oppla team and for the wider NBS community. The final spreadsheet with a detailed explanation was sent out to the Oppla team providing valuable feedback to the platform's database of NBS cases, suggesting for example new filters to facilitate case searches and interlinking the SDGs to the work carried out within the NBS cases.

> QUESTIONNAIRES AND INTERVIEWS TO DESCRIBE NBS GOOD PRACTICES

The selected case studies were then explored in more detail through questionnaires and interviews. The

WORKFLOW DIAGRAM OF OPPLA CASES SCREENING AND DRAFTING OF THE FACT SHEETS



experts (topic leads) of the REGREEN project assisted in formulating guiding questions for each topic. Questionnaires specific to each topic were designed, building from these guiding questions (some common and some topic-specific) and sent again for feedback to the respective REGREEN topic leads.

The aim of the questionnaire was to enable appropriate data collection, both qualitative and quantitative, for populating the fact sheets. The questionnaire was sent to each case owner for responses, followed up by interviews to clarify any open questions, agree on the provision of images, and obtain permission for the use of the obtained information. The interviews were helpful to enable the collection of additional information missed out in the written form via the questionnaires and to answer any new questions which emerged from the analysis of the responses.

> DESIGN OF FACT SHEETS

Through discussion among REGREEN experts, a concrete structure was set up for the fact sheets to capture the most relevant, interesting and essential information from the answered questionnaires and interview processes. The fact sheet content was structured around the following sections:

- Sustainable Development Goals
- Objectives
- Description
- Challenges
- Opportunities
- Lessons learned
- Inspiration for others
- Further Information

A draft for each topic was prepared and shared with the case owners for review and inclusion/deletion of any parts as found suitable by them. Following the integration of the feedback from case owners, a second draft was sent to REGREEN experts and ICLEI colleagues for review to ensure quality check in terms of content and language. After this, a final version of each fact sheet was sent out to the designer for creation of a visually appealing layout and format to ensure easy readability, completing the production process of 13 fact sheets on NBS-related relevant topics, and this one describing the methodology.

Image: City of Edinburgh

Authors:

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GET IN TOUCH

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Nature-based solutions for
NOISE MITIGATION :: BIODIVERSITY :: WATER QUALITY IMPROVEMENT :: EDUCATION :: BUSINESS
Learning from:

REGREEN
NATURE-BASED SOLUTIONS

POLLINATOR-FRIENDLY FOOD FOREST

Adressed SDGs in this factsheet:

Image: TMais Jafari

> OBJECTIVES

Like many cities, the neighbourhood of Huckarde in the City of Dortmund, Germany, is facing social, economic, and spatial challenges. A former mining and steel industry hub, the city district underwent an economic as well as demographic change with residents moving elsewhere. The pollinator-friendly food forest project aims to socially inclusive spaces and foster interaction between the citizens and shape local identity through gardening activities. This project is open for all, irrespective of age, nationality, education or other, often socially separating factors, and delivers a wide range of benefits for the residents.

> DESCRIPTION

The local NGO *Die Urbanisten* supported the creation of a food forest on 3000 m^2 of cleared land, owned by the Catholic Church of St.Urbanus, in Huckarde. A food forest is a cultivated urban forest that predominantly consists of edible plants and fruit-bearing bushes and trees.

In collaboration with a local scouts group and church community, several raised beds and planting shelves were planned, built, and planted. The first step consisted of clearing unwanted shrubs and adding more soil layers. The first layer, which was put down, was a natural, permanent humus fertilizer, followed by a cardboard layer to prevent regrowing weeds. The top layer was made of a 20-30 cm thick layer of wood chips. The whole layer pack is supposed to decompose and compost into forest soil that mimics topsoil. Some areas were treated with acid fertiliser to form slightly acidic soil that is best for low pH preferring shrubs and bushes.

So far, 35 soft fruit bushes, such as raspberries, blackberries, gooseberries, and 20 wild fruit trees like rock pears, elderberry, and cherry have been planted. Simple maintenance consists of regularly replenishing the soil with fresh wood chips and pruning branches. Pruned branches are usually dropped unprocessed where cut, following a method called “chop and drop”. All of these measures increase soil biodiversity, and pollinator-friendly plants improve the type and abundance of insects, which also attract birds. Moreover, fruits produced by the planted trees provide food for both humans and animals like squirrels. Experience from other projects showed that the habitat is populated after one season. However, the percentage of population increase is hard to estimate since establishing a new, fully functional bio-habitat balance takes many years.

A food forest serves many functions and thus provides various benefits: apart from increasing local biodiversity, a food forest enables regular social interaction and community cooperation by growing food, all of which may improve people's psychological well-being. It has the potential to transform the consuming community into conscious producers.

The planning, design, and implementation of the food forest was done in close cooperation between local partners of the EU-funded proGIreg project and the local scouts. At first, ideas and hopes for this project were collected from the pastor of the church and the scouts, after which an expert facilitated the development of the concept of food forest and permaculture. The concept was then presented to the public at an information event and a series of workshops were launched in 2020. This collaborative approach created a feeling of personal involvement among people, which in turn motivated local residents to care for and maintain the food forest in the long term.

Planting the urban food forest was mainly financed by the proGIreg project, whilst the church covered the remaining costs. The budget spent so far ranges around 3,000 €: most of the costs were for soil preparation, raised bed material, construction wood, seeds, plants as well as cardboard and wood chip material. An estimate for calculating the soil improvement measures was: 1 m^3 of compost covers an area of 10 m^2 (with a 10 cm compost layer), representing a weight of 800-900 kg. However, costs could have been reduced even more by asking local arborists to dump wood chips on the site or by propagating plants by cuttings.

Subsequent to the food forest project, D*ie Urbanisten, the South Westphalia University of Applied Sciences* and their partners also started a citizen-driven non-profit organisation called *Naturfelder* to motivate and activate people’s interest in founding voluntary associations promoting biodiversity. Unlike the food forest, *Naturfelder* is site independent. *Naturfelder* associations encompass

activists and experts in the fields of agriculture, permaculture and wildlife, whose goal is to together procure and convert suitable plots of land into flower meadows and insect habitats. Focus here is on actively procuring land, qualifying it with experts and creating concepts for individual sites. These associations also secure financing for converting sites into flowering meadows, while giving participants a chance "to make this place their own". Two suggestions based on the combined experience with the food forest and *Naturfelder* are: 1) if you only have active people, apply the *Naturfelder* approach, and work on finding and establishing sites; 2) if you have only one space, start with a food forest and let that foster community.

> CHALLENGES

Finding suitable spaces for the implementation of this nature-based solutions (NBS) in Dortmund proved challenging. Specifically, the very limited availability of publicly-owned properties made local stakeholders enter into lengthy negotiations about lease contracts with private land and property owners. This resulted in a lot of tedious work to secure suitable properties for the project, postponing the co-design phase for a while. With limited alternatives, the project lead contacted daycare centres and a local school in Huckarde to offer implementing these NBS with young children and students as educational and pedagogical work.

While good ideas are easy to develop, finding the right sites and establishing active, ongoing commitment among project members is often more difficult. The COVID situation had also an important impact on the project, since it was in the initial stages when the pandemic broke out. A series of workshops with local citizens had to be cancelled. It also caused delays in on-site delivery of planting materials and planting interventions in the area. Citizen participation in the co-design was also limited due to COVID-19.

> OPPORTUNITIES

Luckily, Die Urbanisten had permission from the church to use the space for the food forest without having to follow any administrative procedures, such as signing a lease contract. This made things easier and allowed a faster start.

One of the success factors of the project was communicating the food forest concept directly to the church community and conducting educational workshops on building small raised beds in the community centre's yard. This allowed taking all the wishes of the users into account. Compared with other areas, the process was relatively uncomplicated and unbureaucratic. Through many discussions and queries, all wishes could be anchored in the concept. The church community's main concern was that there would be much more work for the community and scouts. Dispelling these concerns resulted in trust building and enthusiasm at being involved in the project.

> LESSONS LEARNED

The actual on-the-groundwork for the project took place in 2020. It was carried out by a very small group from the church community, due to the pandemic, which did not allow organising larger events. Efficient organisation of volunteers and combining working days on site in the food forest with days on which workshops are held, encourages more people to participate in the project.

It is also useful to learn how to best design a food forest in advance; consulting with local permaculturists is highly recommended. In the case of the local food forest project, contact with an umbrella association was first made at a later stage of the project. These types of organisations could support and be helpful in refining the concept and outlining a communication strategy - all highly recommended in the first stages of the project.

When having problems in identifying suitable spaces for a food forest, it is better to start a public campaign and communicate the main goals so that participants can identify spaces during the co-design process.

> INSPIRATION FOR OTHERS

A food forest can be designed and implemented at almost any scale. Even an area of 50 m² is sufficient to apply such an idea. The effort invested in the design of the food forest does vary depending on the desired goals and abilities of the implementers.

FURTHER INFORMATION

All factsheets were produced from questionnaires and interviews conducted by the ICLEI team. Contact ICLEI Europe for more information or access Oppla: https://oppla.eu/casestudy/21617 and https://oppla.eu/casestudy/21240

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LIVING LANDSCAPES IN EDINBURGH

Adressed SDGs in this factsheet:

Image: City of Edinburgh

> OBJECTIVES

The Edinburgh Living Landscape is a nature network that works to benefit both local people and wildlife and make the city of Edinburgh one of the most sustainable cities in Europe by 2050. The network's goal is to introduce nature across the city neighbourhoods and demonstrate that investment in natural capital makes economic sense while increases biodiversity and creates healthier urban ecosystems.

> DESCRIPTION

To achieve the above mentioned goal, Edinburgh Living Landscape aims to establish attractive, bio-rich meadows, shrub beds, and woodlands across the city, thus reinforcing and expanding existing green networks and reconnecting the people of Edinburgh to their natural environment. This project comprises a group of organisations, such as the following: Scottish Wildlife Trust, Royal Botanic Garden Edinburgh, Edinburgh & Lothians Greenspace Trust, University Of Edinburgh, NatureScot, Butterfly Conservation Trust, and Royal Society for the Protection of Birds Scotland, which work together to create a multi-scale network of green spaces.

The project made use of Geographic Information Systems to identify suitable areas in which to act. During the mapping process, potential locations for more naturalised grasslands were identified, always trying to get a spatial balance across the city. The project involves interventions with the existing green estate through a mixture of seeding, bulb planting and relaxed grass cutting regimes. The majority of the locations are situated on aggressively managed grassland areas with strong cutting regimes every few weeks. The introduction of a properly maintained wildflower meadow allows the pollinator populations and other species of insects, birds and mammals to thrive.

Edinburgh Living Landscape (ELL) produces every two years a report on what has been achieved within that period. According to the impact report from 2014-2017, in total there are 840 hectares of grass green spaces in the city, from which 12-13% have been transformed into biodiversity-rich living landscape grasslands. Other quantitative impacts include the creation of 74 new floral meadows and 0,52 ha of woodland habitats.

During those years, the University of Edinburgh carried out 221 meadow pollinator monitoring surveys at different sites and over a period of time to identify which specific species have been benefitting from the changes. The city council measured the extent of the area transformed for the report.

Since the start of the ELL, the council has had an ongoing public information strategy to ensure the citizens were aware of the changes made in local parks and green

spaces. The people engagement approach was delivered by using various tools that include Social media (ELL website, Twitter, Facebook, Blogs, and press releases), council seminars - training sessions, and production of materials for gardeners, council staff, and teachers. As an additional feedback mechanism, every year the city council sends a household survey across the whole city with various questions like: How happy are you with your local green spaces?

The positive formal feedback from ELL participants indicated that the work done by the project is motivating a shift in attitudes, improving participants' knowledge of wildlife habitat creation techniques, providing skills, and generating awareness. This increase in motivation also allowed all the participants to take measures in their gardens or encourage other citizens to act. The outcome was a greater demand in local communities for neighbourhood improvement support.

ELL is financed by the City of Edinburgh Council through its existing core budgets within the Parks & Greenspace Service. This funding comes from the Scottish Government, through aggregate external finance (AEF). It consists of three parts: revenue support grants, non-domestic rates, and income and specific grants. Additional income comes through the Council Tax, which the council itself sets. Some funding for projects has also been secured through the Scottish Wildlife Trust (SWT) and external grant awards from NatureScot.

> CHALLENGES

The main challenge was people`s (general public and staff) perception towards “wild areas”. People are used to areas being maintained differently, therefore many of them due to lack of knowledge do not understand what the project is trying to achieve with the new forms of landscape maintenance.

> OPPORTUNITIES

After initial scepticism and some opposition, there has been a broad acceptance and increased awareness towards the project activities. People appreciate the efforts made by the city council and the project, their feedback is always very positive and often they demand for more actions.

> LESSONS LEARNED

Ongoing public communications are key to the project becoming a success. Communication and explanation of landscape management changes to the wider public, elected members, and also the staff have proved crucial. Also, public engagement and consultations have to be constant. Community engagement from Friends Groups, community groups, schools, and individuals has to be prioritised.

Training of the staff is another important factor to take into account in order to increase the green areas maintenance expertise.

> INSPIRATION FOR OTHERS

The aim has been to make Edinburgh an urban exemplar of a Living Landscape approach to landscape and green estate management across Scotland, the UK, and further afield. Any city that wants to introduce nature across their neighbourhoods can develop a similar green spaces network. Actions such as, maintenance of wildflower meadows and management of grassland areas´ cutting regimes can be replicated in other metropolitan areas and receive a very positive feedback from the general public, thanks to good communication and engagement strategies.

FURTHER INFORMATION

All factsheets were produced from questionnaires and interviews conducted by the ICLEI team. Contact ICLEI Europe for more information or access Oppla: https://oppla.eu/casestudy/21288

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GREEN ROOF STRATEGY OF HAMBURG

Adressed SDGs in this factsheet:

Image: Gruendach / Unilever

> OBJECTIVES

The Green Roof Strategy Hamburg (Germany) was initiated in 2014 with the first green roof symposium, making Hamburg the first major German city to launch such a comprehensive green roof strategy. Its goal is to green at least 70 percent of both new buildings and suitable flat or gently pitched roofs undergoing renovation. The Ministry for Environment, Climate, Energy, and Agriculture supports the project with three million euros in total until the end of 2024. The strategy is based on four pillars: promotion, dialogue, policy and research. Green roofs and facades have different positive ecosystem services and support several SDG's. They improve environmental conditions by reducing noise, reducing fine dust particle concentration, lowering surface temperatures, offering retention and evaporation, reducing drainage system congestion and reducing risk of flooding. They can, in general, be seen as actions for climate adaptation.

> DESCRIPTION

Integration of the green roof strategy into overarching strategies (e.g. Hamburg's climate plan) gave the strategy a wide and stable foundation. While pushed forward by the environmental ministry, the Green Roof strategy was developed in close cooperation with different special authorities. In implementing the strategy, the ministry needs the support of the district authorities – to apply the developed instructions for green roofs and facades.

Hamburg has incorporated a binding green roof regulation in many land-use plans for 20 years. In accordance with the Nature Conservation Act, green roofs and facades are considered possible measures for compensating the impact of building on nature. The city of Hamburg regularly reviews its green roof legislation, in particular the ecological quality standards for the roofs. The following elements were crucial in the early stages of the green roof strategy: 1) developing a urban land-use planning guide w.r.t uniform installations for extensive roof greening throughout the city and making them mandatory on the long term; 2) introducing a split wastewater fee; 3) launching a 3.5 million euro support program for green roofs and facades; 4) organising a publicity campaign with international outreach; 5) promoting roof greening as an eligible flagship for sustainable companies in the city; and finally 6) launching a green roof and facade competition to generate best practice examples and promote the funding program.

Within large parts of the city, the green roof area increased from 124 ha to 168 ha over the last six years. Within projects, such as CLEVER Cities Horizon 2020, there is a chance to test ways of improving the implementation of green roofs and facades to raise the positive benefits derived from the NBS. For example, experimenting is done to design roofs in ways that create biodiverse hotspots for different insects, for example by bringing nesting aids and other materials for bees on the rooftop. Another project, will implement a smart flow control by creating retention basins on roofs, to retain water during heavy rains and release it upon need during dry periods. There is also a plan to combine green roofs with solar panels for energy production. These solar panels will work more efficiently over green roofs, as evaporation cooling lowers the microscale air temperature and increases energy production in the solar cell. Other than this, the HafenCity University Hamburg will monitor the retention capacity of green roofs. This long-term observation is important to determine the retention capacity of green roofs and prove the effectiveness of green roofs, especially during heavy rain events.[1] There are about 16.000 housing units in planning to adopt green roofs and/or facades in the coming years.

> CHALLENGES

Low technical knowledge and trust: The lack of knowledge in regard to fire safety but also maintenance have been barriers in the continuous progress of the strategy. It has also been questioned whether green roofs indeed provide the needed water retention capacities especially with a heavy storm water event. Since the evidence stems from small scale experimental settings, there is a concern that real and large roofs would not provide adequate retention service. To understand this better HafenCity University is currently researching this question. Further, when initiating the Green Roof Strategy, it was challenged whether Hamburg has sufficient flat roofs to be able to succeed with the strategy. GIS-based research answered this question, showing that over 40% of the city's roofs are flat and suitable for greening.

1 Richter, M.; Dickhaut, W. (2016): Evaluation of green roof hydrologic performance for rainwater run-off management in Hamburg. Conference Proceedings of the International Conference on Sustainable Built Environment, Hamburg 07th-11th March, pp. 536-545.

Lack of scientific evidence: In a few cases, the scientific support is missing as little on-site real scale measurements have been made. For example, it is still difficult within the land-use planning sector to implement greenery on buildings for noise mitigation and air quality improvement owing to lack of research on the correlations. In order to make initiatives like green facades mandatory, there is a need for good scientific evidence.

> OPPORTUNITIES

Political will and common goals: The initial binding political decision was very effective giving the strategy the needed political force in discussion with other governing bodies of the city. Another very critical factor is the link to other overarching strategies of Hamburg, the Hamburg Climate Plan, RainwaterInfraStructureAdaptation (RISA) Strategy, and the Qualitäts Offensive Freiraum (quality offensive for open space). Incorporating common goals from these strategies into the green roof strategy and vice versa increased the strategy's legitimacy.

Financial incentives and knowledge exchange: As most of the roofs are privately owned, the ministry's influence remains limited to future planning. In that regard, financial incentives are relevant to realise NBS and bring on board the general public, experts and get media attention. With the incentives, the motivation for private partners increased leading to implementation activities. In the end, the support by national funding programs from the federal ministry of environment is helpful as those programs foster the exchange also beyond the city scope.

> LESSONS LEARNED

Whenever trying to implement a NBS strategy, all bodies of the city should be included in the process and regularly updated about the progress to raise the awareness of the topic and show the successful implementation. Taking into account a wide range of planning tools, it was possible to identify a number of factors that could positively influence one another and thus contribute to the success of the strategy. The advantage in Hamburg was that the challenges (reduced green space within a growing city, climate change, biodiversity loss) were omnipresent.

One success factor for this strategy is also the participation of different stakeholders in the strategy creation and aim definition. This increased both awareness and acceptance of the project. The public relations work included the creation of a "brand", a website, brochures and flyers, posters in the urban area, film contributions, and publications in daily newspapers and trade magazines as well as on social media. In order to address the target groups in an adequate manner, there are regular meetings with multipliers from professional associations and contributions to trade fairs, lectures and events for different stakeholders. Hence, communication and dialogue/involvement is key to changing practices and creating a demand for green roofs among residents and companies. This requires a dedicated full-time communication officer and structured co-creation processes.

Nevertheless, disservices of green roofs – e.g. the case of many seagull pairs breeding on a large green roof during spring– necessitates a lot of dialogue and awareness raising as well as management needs.

> INSPIRATION FOR OTHERS

The Green Roof strategy Hamburg is a successful story of how a citywide agreement fostered an NBS implementation. The fundamental pillars of this strategy can be repeated elsewhere, as they allow for adjustment in focus to accommodate distinct local context and conditions.

Here are some tips for cities wanting to develop a similar strategy:

- Integrate into overarching strategies (e.g. climate plan, etc).
- Work together with all stakeholders to take into account their concerns.
- Combine support and promotion programs with accessibility of practical examples for the public and experts.
- Produce content and images for the public, experts and media.
- Distribute advice and training content for different target groups.
- Provide regular feedback and update meetings with partners.

Thus, a combination of regulation, promotion and dialogue, financial incentives, science advice and evaluation are key for successful implementation. Nevertheless, application to an entire country might be difficult due to a risk of oversimplification and lack of knowledge or consideration of local contexts.

FURTHER INFORMATION

All factsheets were produced from questionnaires and interviews conducted by the ICLEI team. Contact ICLEI Europe for more information or access Oppla: https://oppla.eu/casestudy/21219

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THAMESMEAD NATURE FORUM OF LONDON

Adressed SDGs in this factsheet:

Image: CLEVER Cities, London

> OBJECTIVES

The Thamesmead Nature Forum, as part of the CLEVER Cities project in London, was established in 2018 to create an "Urban Innovation Partnership" that would help shape and guide the CLEVER Cities work in Thamesmead, London. The idea is to provide an open forum for all people in Thamesmead to discuss nature and environment issues that can lead to collaboration amongst multiple partners from diverse backgrounds. The forum also challenges involved parties to think out of the box and curate interesting content that could appeal to a variety of audiences with a wide range of interests. The aim of the forum is thus to act as a first step towards creating a more bottom-up governance and decision making model.

> DESCRIPTION

Thamesmead district, in South East London, is managed by Peabody Trust and has a current population of about 45,000 people. Quite a diverse place in London, Thamesmead is typically 50% Black and Minority Ethnic, and 50% White. Large parts of Thamesmead are currently the subject of a billion-pound estate regeneration and renewal project that forecasts to double the district's population by 2050. The project involves complete revitalization and redevelopment of parts of the estates to create new homes suitable for the future, keeping in mind the health and wellbeing of residents as well as the nature around. The remainder will undergo a series of interventions to improve and enhance social connectivity within and throughout the estates, ensuring more social cohesion and community building.

CLEVER Cities is involved with retrofitting NBS into a 1960s housing estate in South Thamesmead. The solutions to be installed will mostly focus on the use of green and blue infrastructure to create more resilient neighbourhoods. Chosen solutions will aim to:

- Promote healthier living by providing spaces for physical activity and relaxation.
- Cool the city and absorb stormwater to lessen the impacts of climate change.
- Filter pollutants to improve air and water quality.
- Make streets clean, comfortable and more attractive to encourage walking and cycling.
- Create better quality and better-connected habitats to improve biodiversity and ecological resilience.

Similar to other areas undergoing regeneration projects, the issue of gentrification looms large, resulting in a lot of mistrust in the authorities by many people in Thamesmead. To encourage trust building and to enable co-creation and socially inclusive decision-making with local communities, the CLEVER Cities project partnership of Peabody, Groundwork and Mayor of London, created a new governance instrument: the Thamesmead Nature Forum.

Forum attendees are a mix of people working in local authorities, residents of Thamesmead, and members of local interest groups, all united by a shared interest in nature and community governance. The forum is co-chaired by the social housing association responsible for the delivery of the public realm works (Peabody) and a local environmental regeneration NGO leading on community engagement and communications (Groundwork) (Wilk et al., 2020b). Peabody will continue to administer the forum after CLEVER concludes. The aspiration is that this may eventually be a self-governed group.

The forum is currently established with the aim of making a wide range of stakeholders heard. Open to all interested residents, it sponsors events and informal chats to create connections between existing community groups, initiatives and actions underway in Thamesmead. A new, non-traditional position of community Gardener in Residence has been created to undertake outreach work within the local community and make on-the-ground connections with residents. Apart from traditional "green-keeping", the gardener provides hands-on experiences on gardening through workshops, drop-in gardening sessions for residents of all ages, and other events that are advertised by social media, posters, and their website (Wilk et al., 2020b).

The Nature Forum is also acting as a springboard for a new Community Design Collective that will act as a co-client for the CLEVER nature-based solutions in South Thamesmead Estate.

> CHALLENGES

Other forums focusing on culture and business have been successfully established in Thamesmead, but a forum focusing on blue and green spaces is new. The ambition from the outset was to create a group that could help guide decision-making in CLEVER

Cities and give direction to the implementation in Thamesmead. Striking the balance between an informal network and a strategic group proved challenging at first. It was important to understand what would work in the forum in terms of curated content or more strategic discussions. The administrators have found a good balance by using a ***learning by doing*** approach. Attempts to co-create areas of focus and encourage a self-led approach felt clunky and didn't resonate with attendees, so instead we moved towards a more traditional set up, with a pre-agreed agenda and sharing updates, with shorter time at the end for members to feed in or give announcements.

Another severely limiting factor in such engagement activities is the time that people in the neighbourhood can invest. This leads to difficulty in building a core group and thus enough momentum to keep the forum running smoothly. Interestingly, the move to online meetings, due to Covid-19 restrictions, resulted in better and more consistent attendance.

Balancing the varied interests of all participants is an ongoing challenge. Providing opportunities for all to contribute as much or as little to the agenda as they wish, helps. In terms of engagement, it has been easier to recruit new arrivals to Thamesmead, such as an emerging artist community, than some of the older, more established residents. Efforts continue to reach more broadly to ensure a good balance of new and established residents of Thamesmead.

> OPPORTUNITIES

Prior to the CLEVER Cities project, there was already an ambition to create a 'blue green' group in Thamesmead. However, the CLEVER Cities project helped to motivate all the partners and provide additional resources to get such a community engagement platform up and running and also maintain momentum.

> INSPIRATION FOR OTHERS

A few key tips to create, run and maintain a similar format for a community forum for discussions on NBS and their implementation are:

- Find a few key members of the community who are really passionate about the subject area. Work with them to test ideas for the group and then refine the approach as you proceed.
- Be honest and upfront if this is the first time you are convening a group – don't act like you have all the answers.
- Know when you need to adapt an approach or style – ask for feedback early.
- Work towards empowering the group – some will want to participate only a little, some will want to be more heavily involved – find a way to devolve decisions to those who are keen.
- Consider paying people who want to be more involved, to formally include them. "We get paid for our work, why shouldn't they?"
- Feedback the impact the conversations have. Show people that their attendance is valuable.
- Be mindful of people's time – it is limited, and generosity runs out.

> NEXT STEPS

Building on the learning and experience of the Nature Forum, CLEVER Cities team are now establishing a Community Design Collective, to support the co-design process for the NBS. This group of residents will be recruited and paid for their time, approximately 15 hours per month. There is a need to recognise that people are time-poor and have challenging lives, hence paying for them to invest their time is a way to enable a wide range of people to be part of the Collective. They will participate in a number of training and design sessions to ensure that emerging designs truly reflect local need.

In terms of the Nature Forum: there is ongoing promotion to try to involve every willing resident. The move to online has been a success, but it is important to be mindful of the digital divide. Many people can have limited internet access, so a 100% online presence is not desirable in the long run.

By reaching out to a diverse group of community members there is a possibility of finding people who could be future community leaders and champions. Nicola, the CLEVER Cities project manager from GLA says "We have had to adapt our ways of engaging with people, especially in response to Covid-19, as just stopping wasn't an option. Through the Nature Forum and the Community Design Collective we are testing different approaches to creating strong networks. If at the end of CLEVER, we get one local group formally established, we would consider it a win."

Most importantly, from an upscaling perspective, it has been vital to gather learning to help share the results, such that successful elements may be replicated elsewhere in London and Europe.

FURTHER INFORMATION

All factsheets were produced from questionnaires and interviews conducted by the ICLEI team. Contact ICLEI Europe for more information or access Oppla: https://oppla.eu/casestudy/21469

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FARFALLE IN TOUR PROJECT OF TURIN, ITALY

Adressed SDGs in this factsheet:

Image: Farfalle in ToUr Turin

> OBJECTIVES

The Farfalle in ToUr project in Turin, Italy, combines butterfly conservation with providing job opportunities for citizens, who live with mental or physical illnesses. Connecting people with nature by creating and maintaining butterfly oases is at the core of this project. The Farfalle in ToUr demonstrates the potential of nature for improving health and well-being and social inclusion in a city.

> DESCRIPTION

The project was founded after doctors enquired how patients with mental and physical illnesses could be involved in protecting butterfly populations in the City of Turin. What started as a project with no external funding, running on low costs and citizens volunteering, gained more attention once it became an active part of the EU-funded project proGIreg in 2018. It started with as few as two volunteers as 'users' in the project and went on to recruit 12 paid users who now act as experts for the project. These users are in charge of co-designing all activities surrounding project planning, implementation and awareness raising. Since they need to be out in the gardens, interact with others and especially school children; these users, who all are patients with mental or physical illnesses, feel resourceful, relevant and connected with society and nature. There is a primary focus on awareness raising in this project and several public events, photo exhibitions and meetings take place during the course, with a lot going online following the pandemic restrictions of course.

The main actors involved and targeted in this project are not only the patients as experts, but also school children, educators working for different social cooperatives (Il Margine and La Rondine) and refugees. This multidisciplinary approach and being able to reach out to vulnerable communities and children makes it quite unique. The project also promotes citizen science: citizens are involved in planting plant species, which attract pollinators and butterflies in their own gardens or balconies particularly well. Twice a year citizens are invited to Pollard Walks, which entail regularly counting butterflies along transects during flight season. These walks are organised in partnership with the European-wide initiative- "The Butterfly Monitoring Scheme" to help monitor the butterfly population. Overall citizens are involved in the planning, designing, implementation as well as monitoring of the Farfalle in ToUr project. All data collected is open source and can be accessed online to understand the changes in biodiversity before, during and after the implementation of these Butterfly Oases.

The Butterfly Oases are all in gardens owned by public institutions such as the Local Health Company. Currently, there are currently four Butterfly Oases with ten more gardens to follow in future. In 2020, some of the Butterfly Oases were integrated into the city's green corridors to allow pollinators to move even easier across Turin. Citizens were also given plants and seed bombs to attract pollinators in their surroundings.

> CHALLENGES

Like every project, there are some challenges involved as well. Some of them are listed below:

- Including different municipal departments led to diverging agendas and viewpoints emerging which had to be aligned and compromises to be found.
- There were some technological barriers, e.g.:

  - Difficulty in obtaining sufficiently sized green areas
  - Difficulty in installing an adequate irrigation system with one solution chosen was to plant resilient and drought resistant plants.
  - Difficulty to procure native cultivars to plant in the oases.
  - Need to establish a specific plant- insect interaction
- The lack of knowledge about wild pollinators had to be addressed as well.

> OPPORTUNITIES

Some of the key opportunities for and within this project are:

- Having a couple of mental health centres on location in the city made it possible to involve more in establishing butterfly oases and engaging them in the butterfly monitoring process, which in turn made it easier to spread the project work and outreach.
- The users and experts of the oases stay in the same mental health centre for their whole life, so ideally they could take part in the project for years to come. This enables the long term maintenance of the project.
- There is a shared mental health system between Italian cities, which could help in replicating and adapting the project concept beyond Turin.
- The multidisciplinarity of partners was key in making the project successful
- Being part of the ProGIreg project created many synergies between the project and the City of Turin and new collaborations were born with local associations. The collaboration between project partners, municipal departments and citizens is essential for its success.

> LESSONS LEARNED

The project has run for quite a few years now and many insights were gained since. To make the implementation, management and maintenance of the project run smoothly, it is necessary to include different departments within the municipality and across public bodies right from the start. They should join and be part of the co-creation and co-design process for the nature-based solution implementation. Another essential element is to involve multiple stakeholders and be empathetic towards users and citizens ascertaining their dedication and commitment to remain part of the project in the long run and take ownership of the activities. It is also fundamental to consider local realities and governance structures in place (e.g. neighbourhood and environmental associations, city districts, urban farmers) and involve all, particularly citizens and students, in disseminating insights and taking part in citizen science actions. Improving the interaction between different local actors helps in strengthening local networks and connecting people with the same aim: a healthier and more viable city. The social networks are fundamental for users, allowing them to come out of isolation by sharing experiences and skills with other stakeholders.

> INSPIRATION FOR OTHERS

These butterfly oases are easily established in other cities within Italy as the same mental health organisations are active across many cities. This provides many more opportunities to engage citizens with mental illnesses. It is also important that the butterfly monitoring methods are shared and accepted by the scientific community and commonly used also in other projects. Outside of Italy projects such as the Farfalle in ToUr project can inspire cities and communities in other countries that have a similar mental health system and in which users are engaged in different activities organised in diurnal centres to stimulate new interests and skills with those living with such illnesses. Mostly, mental health centres are managed centrally by coordinating public bodies, which makes it easier to involve different centres around the country.

Today many projects focus on urban regeneration. One strength could be to couple in the nature-based solutions with connected aims, like urban pollinator protection and social inclusion. This could ensure a wider array of stakeholders interested in different environment or social aspects of the project.

FURTHER INFORMATION

All factsheets were produced from questionnaires and interviews conducted by the ICLEI team. Contact ICLEI Europe for more information or access Oppla: https://oppla.eu/casestudy/21250

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Nature-based solutions for
EDUCATION :: WATER QUALITY IMPROVEMENT :: BIODIVERSITY :: AIR QUALITY IMPROVEMENT
Learning from:

"*LET'S MAKE OUR SCHOOL A GROWING PLACE*" PROJECT OF SANTHIÀ, ITALY

REGREEN
NATURE-BASED SOLUTIONS

Adressed SDGs in this factsheet:

Image: Enrica Ardissino

> OBJECTIVES

Let's make our school a growing place! is the name of a project in Santhià, Italy, which took place in 2020 with the intention of resuming it again in late 2021. During that time, six green walls were constructed inside a school yard in collaboration with teachers and students. The aim of this project is to educate pupils on the importance of biodiversity and nature-based solutions by raising awareness and offering knowledge on caring for and respecting nature. The goal is to help students understand the relevance and multiple benefits of nature-based solutions in responding to sustainability challenges the city faces, such as climate change impacts, biodiversity loss, deteriorating environmental quality. At the same time, they also learn how nature-based solutions offer economic opportunities and foster social well-being.

> DESCRIPTION

In close collaboration with the Ministry of Education, the project was funded for developing the vertical gardens by the municipality of Santhià for developing vertical gardens, in a primary school (Collodi Primary school) with close collaboration of the Ministry of Education. The estimated funding obtained for the project was about 5000 Euros, out of which some money will be also used to create other green areas in some other neighborhood schools of Istituto Comprensivo Sant'Ignazio da Santhià, in the neighborhood. Santhià being a small city, Santhià saw close and effective collaboration with local authorities, especially the education department. The school has good contacts and relationships with the authorities and they have been quite supportive in the implementation of the project. The education department is keen on tackling the issues of climate change and nature conservation as well as understands the importance of early education for children in this field. The project was initiated by a call from European SchoolNet, in which some local teachers from the schools were invited to design learning scenarios for including nature-based solutions in the school curriculum.

Through this project, the 8 year old pupils could learn about the concept of sustainable development, the UN Sustainable Development Goals, the importance of urban greening for citizens living in cities as well as the meaning of nature-based solutions. Even at this early age, the students began to comprehend the relatively complex issues around sustainability and understand the significant role of plants for all living organisms. Several interactive methods to engage the students such as field experimentation, observation and comparison between peers. The teaching materials were designed to be compelling and motivating, helping to build a curious and conscious attitude in the students towards nature. However, due to ongoing restrictions during the COVID pandemic, many of the activities were carried out

at home using online platforms for communication. The citizens in general and especially the parents of the school students were highly interested in the topic of nature-based solutions and actively participated in the educational proposal and the initiative itself. A feedback mechanism was put in place to gather inputs and feedback from the parents incorporate it in the initiative. Thereafter, the learning scenarios were presented in the Piedmont regional school, encouraging them to take on some good practices and lessons learnt and implement the learning scenarios in their school as well.

> CHALLENGES

The restrictions applied during the COVID pandemic led to all school education activities being moved to virtual learning platforms. Clearly, the project would have been much more effective if the pupils could have actively engaged in setting up the green walls at the school themselves instead of learning about the multiple benefits of nature-based solutions such as green walls from their homes.

> OPPORTUNITIES

There was a huge turnout and active engagement of many citizens, especially teachers, parents and relatives - in total more than 1000 residents of the city of the size of 9000 inhabitants. The school is considered an important institution for the community and the support gathered by the citizens proved that.

> LESSONS LEARNED

The project lead Ardissino said that "it is important to reach out and collaborate with local authorities, colleagues and all school staff because the collaboration and participation of all in the nature-based solutions theme is indispensable for moving forward towards a conscious attitude towards the environment." She also suggested the need to propose and use captivating and engaging activities for young pupils to get inspired and apply a 'learning by doing' approach to create authentic and effective learning.

> INSPIRATION FOR OTHERS

The learning Scenarios can also be employed in other schools as well and with a small budget the provision of nature-based solutions teaching and practical experimentation can be put into practice to help students of all ages to learn about the role of nature in our daily lives and its importance for society. Learning scenarios can be highly inspirational for any school in any country to adopt to teach and encourage students of all age groups to learn about sustainability and the underlying importance of nature in our surroundings.

Image: Enrica Ardissino

FURTHER INFORMATION

All factsheets were produced from questionnaires and interviews conducted by the ICLEI team. Contact ICLEI Europe for more information or access it on NetworkNature https://networknature.eu/product/22217

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GORLA MAGGIORE WATER PARK

Adressed SDGs in this factsheet:

Image: JRIDRA

> OBJECTIVES

The Gorla Maggiore water park serves as an excellent demonstration case for the effectiveness of nature-based solutions in providing a broad range of ecosystem services, such as water quality improvement, flood mitigation, biodiversity protection and increase, as well as societal co-benefits related to new recreation opportunities and enhancement of human health and well-being. Serving as a trial to test the feasibility of Constructed Wetlands (CWs) to treat Combined Sewer Overflows (CSOs), the Gorla Maggiore water park has demonstrated the high effectivity of nature-based solutions. Apart from treating sewage overflows, the setting also reduces flood risk and provides spaces for recreation, whilst protecting and increasing wildlife and providing health benefits for residents.

> DESCRIPTION

The region of Lombardy is one of the most populated and industrialised regions in Italy, but also in Europe. During heavy rainfall the problem of CSOs arises, as significant amounts of pollution get discharged into surface water bodies. In more detail, the textile and coal industries are sources of surfactants, which can foam and reduce the re-oxygenation rate and oxygen levels of water, harming aquatic life. This mixture of domestic wastewater mixed with rainwater is usually not conveyed towards conventional wastewater treatment plants during rain events because the capacity of the sewer is exceeded. Therefore, the combined flow gets discharged directly into rivers and lakes, subsequently polluting them. As a result, the poor ecological status of water bodies does not satisfy the EU Water Framework Directive.

To reduce pollution from CSOs, it is necessary to manage the settings either upstream or downstream. Upstream controls can minimise the rainwater flowing into the sewer system, whereas the control downstream occurs by directly targeting the CSOs. To enable this, underground storage tanks accumulate the most polluted water and pump it back to the wastewater treatment plant after the rain events.

Gorla Maggiore, a municipality of ca. 5000 inhabitants in the Lombardy Region, showcases a set of constructed wetlands (CWs) surrounded by a park on the shore of the Olona River. Prior to the installation of the park with CWs, the CSO was discharged directly, without any treatment, into the Olona river. Inaugurated in 2013, the Gorla Maggiore water park offers a solution to treat the first flush of CSO (domestic wastewater mixed with rainwater) and can be considered one of the first examples of applied nature-based solutions for CSO treatment in Italy. The area was previously used for poplar plantations. While grey infrastructure formed by underground first-flush tanks and open-air dry retention ponds could contribute to both managing flood risk and improving water quality, it could not provide relevant changes in terms of biodiversity net-gain and provision of recreation facilities. And that is exactly what the Gorla Maggiore water park offers. The park's CW vegetated set includes a pollutant removal area with a grid, a sedimentation tank and four vertical subsurface flow basins for pollution retention and flood buffering. With an extended retention basin that works as a tertiary treatment for the CW effluents, the park stores and treats second flush, while slowing down the discharge in the river and therefore contributing to flood risk control. The setting not only allows for polluted water to be treated on-site by natural physical, physiological, and biological purification processes, but also provides the community with attractive recreational areas. The CWs are surrounded by information panels, cycling and walking paths, public green spaces and restored riparian trees. Throughout an area of 6.5 ha, multiple services for nature and society are performed within the park: water quality improvement, fostering flood management, biodiversity conservation and provision of an area for city residents to get in contact with nature and improve their physical health and well-being.

> CHALLENGES

Usually decision-makers from municipalities and subnational governments are inclined to opt for conventional grey infrastructure solutions to solve problems related to the discharge of polluted outflows into water bodies. There is an overall lack of awareness towards the numerous positive effects of nature-based solutions for water quality enhancement, as well as lack of technical implementation expertise and therefore, political decisions tend to avoid greener solutions that would require new protocols, standards or frameworks. The region of Lombardy has a regulation in place that requires that municipalities treat combined sewer overflows. However, a common limiting factor for the application of nature-based solutions is that the usual practice remains in installing grey solutions: the water gets stored in a concrete tank, often positioned underground, and later gets pumped, which is not very sustainable due to energy demand.

> OPPORTUNITIES

One major enabling factor for the implementation of the Gorla Maggiore water park was the publication of a scientific publication at the time pointing out CSO as one of the three main reasons for the goals of the Water Framework Directive not to be achieved. Good design definitely also played a role, as the maintenance demands of the system used within the water park are quite low. Another supporting factor was the site's topography, which made it possible for the system to work mainly by gravity, as the water naturally flows from upper basins to lower basins.

A further supporting factor relating to the region's regulatory framework is that recently Lombardia has approved a regulation demanding that water utilities perform the treatment of combined sewer overflows. Finally, in terms of governance, the close collaboration between technical staff from the municipality, designers and water engineers during the planning and delivery phase of the water park was an enabler, as well as the full support of politicians, who helped with the authorization procedure and allowed for communication processes to raise citizens' awareness on the benefits of green infrastructure.

In terms of funding, the CARIPLO foundation has enabled the installation of numerous CWs in the Region of Lombardy within the last decade. The foundation has been supporting experimental initiatives to promote environmentally friendly solutions and by co-financing European projects that improves the environmental conditions of the region, enhancing the biodiversity network and promoting the resilience of the territories. Also from a financing perspective, it was quite relevant that part of Lombardia's subnational funds were directed at the planning and implementation of the Gorla Maggiore water park. In fact, the construction of the Gorla Maggiore water park has been funded by the regional government and this private foundation (Regione Lombardia and Fondazione Cariplo).

> LESSONS LEARNED

The major lesson learned is that it has succeeded in demonstrating that the green infrastructure in Gorla Maggiore has an equally efficient or even better technical performance than the alternative grey infrastructure to address the area's water purification and flood protection needs. In terms of costs, the green infrastructure of Gorla Maggiore had the same investment cost of the grey infrastructure alternative (see Liquete et al., 2016). A technical study using multi-criteria analysis was carried out to assess the multiple benefits - environmental, social and economic - provided by the peri-urban water park within the framework of the OpenNESS project (FP7). From the obtained results, a further lesson learned was that for similar costs, the use of green infrastructure ensured not only a good performance in terms of water purification and flood protection, but clearly provided additional benefits such as wildlife support and new recreational opportunities. This points out the advantages of adopting an integrated valuation approach prior to decision making processes. Therefore, a clear recommendation that came out of the Gorla Maggiore experience is that it is relevant to consider the manifold ecosystem services provided by nature-based design from the early stages of decision making.

In terms of water policy, according to the European Commission's recent publication "Blueprint to safeguard Europe's water resources", nature-based solutions and green infrastructure are highlighted as a valuable alternative to classical grey infrastructure (e.g. embankments, dykes and dams) for the restoration of riparian areas, wetlands and floodplains to retain water, because they can also support biodiversity and soil fertility whilst preventing floods and droughts. The document also identified nature-based solutions as highly effective in the implementation of the Water Framework Directive and the Flood Directive.

> INSPIRATION FOR OTHERS

The Gorla Maggiore water park and the many ecosystem services delivered by the applied nature-based solutions serve as inspiration to any municipality interested in treating CSO before it gets diverted to water bodies. The case of the Gorla Maggiore water park is representative and inspirational for other municipalities. Since it's construction in 2013, the Region of Lombardia has been installing many such nature-based solutions for CSO treatment and water quality improvement in the region. The case was successful at highlighting the manifold benefits of integrated regional water management, also considering support of wildlife and biodiversity-netgain, as well as the improvement of recreation offers for people and related enhancement of well-being and human health.

As water-related projects comprise a high degree of complexity, a series of unforeseen co-benefits might be achieved. Therefore, when considering replication or similar implementation of nature-based water treatment schemes, it is recommended to run multi-criteria analysis studies to assess potential co-benefits from an ecosystem service perspective, also considering qualitative achievements without a monetary value. This project is an inspiration not only due to the implementation process itself, but also due to the study that was realised during its implementation, which helped in the communication with stakeholders and the local community, increasing the awareness of the benefits provided by nature-based solutions and laying the ground for the promotion of integrative practices that protect freshwater ecosystems whilst also enhance people's wellbeing.

FURTHER INFORMATION

All factsheets were produced from questionnaires and interviews conducted by the ICLEI team. Contact ICLEI Europe for more information or access Oppla: https://oppla.eu/casestudy/17252

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Learning from:

THE REDUNA PROJECT IN ALMADA

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Adressed SDGs in this factsheet:

Image: City of Almada

> OBJECTIVES

One of the consequences of global warming is sea level rise. In urban settings along coastlines, rising seas threaten not only houses, but also infrastructure such as industries, roads, power plants, freshwater aquifers, etc. Rising sea-level also pushes destructive storm surges further inland, posing very high risks for coastal populations, as storm surges can push water kilometres inland, causing extreme flooding far from the coast.

The Portuguese ReDuna project aims to restore the natural capacity of the Almada sand dune-beach ecosystem to healthily respond to natural drivers, enhancing its resilience to sea-level rise and storms. By monitoring in detail the dune ecosystem, the project has been providing scientific and technical knowledge on effective restoration techniques, which provides valuable information for vulnerable coastal areas.

> DESCRIPTION

Almada is a coastal city with a 13 kilometres long coastline on the Atlantic shore. It is visited every year by 8 million tourists during summer. However, due to sea-level rise, the area's current coastline regression puts in danger tourist services and existing private infrastructure, making coastal protection a high priority in Almada, Portugal. The beaches and the dunes are structures that are at the same time extremely sensitive and highly adaptive ecosystems towards environmental drivers. Their flexibility makes them react easily to the forcing functions of wind, ocean and sediment supply patterns, acting as a natural barrier.

The ReDuna project started in 2014, in response to strong winter storms in the coast of Costa da Caparica, which caused the destruction of the dune system. After this event, the beach was sand nourished and the dune profile along 1.1 kilometre of coast was restored using willow sand fences and planting of native dune plant species (100,000 plants) to help the recovery process. For this end, seeds were collected from a nearby area to preserve the local genetic integrity of the site. Also, human pressure mitigation measures were implemented such as pathways, fences and project communication. The construction phase took 6 months. Project monitoring is still being carried out, to show how an ecosystem-based protective structure can be self-sustainable. Four years after the initial plantation, roots were more than 4 metre deep and in high density, forming a strong root network that stabilised the foredune. The restored dune fostered resilience to storm effects and coastal erosion due to a more stable sediment transfer and balance between the dunes, the beach and the ocean floor. In March 2018, the restored dunes provided an effective response to Storm Emma.

The idea was to help the ecosystem restore itself and regain complexity, while tracking the changes through monitoring led by the Faculty of Science of Lisbon University, Centre of Ecology / Geology research group. Geomorphological and ecological parameters were monitored at six-monthly intervals initially, and then yearly with indicators as geomorphological evolution, beach-dune sediment stock, biodiversity colonization (new plants and animals), vegetation survival, community structure evolution, impact of fences on survival, growing and establishment of plants, for example. To detect the site's geomorphological changes, a GPS-based monitoring of the transect was performed, creating a 3D-model of the dunes. Nowadays, photographic data can be easily obtained by drones, which is a non-intrusive method. Thanks to these photos the survival and growth rate of the dune vegetation as well as the colonisation of new plants in the dune system can be analysed. The results obtained during the first two years of the project showed that 90% of the planted native species have survived, attracting 49 new wildlife species, which increased biodiversity and provided ecological resilience to the restored ecosystem.

The ReDuna project established strong community involvement from the very beginning. The area's design was presented, discussed and defined with engagement of target groups, who could identify themselves with the project goals and actions from an early stage. After the implementation phase, several maintenance actions followed, which included native species plantation and invasive alien species removal with the involvement of the local community, NGOs and schools, with the support of the Municipality's Environmental Education and Awareness Division. The ReDuna project was financed by the EU Structural & Cohesion Funds for coastal protection through the National Environmental Agency of Portugal. The hard costs during the first phase associated with structural actions, without considering human resources, conducted studies, project development and monitoring reached 250,000 EUR. Maintenance campaigns are foreseen within the dune system after each summer and each storm season, as there is need to refresh the willow fences infrastructure, replace part of the vegetation and renovate some walkthroughs.

> CHALLENGES

The economic valuation of ecosystem services is still a challenge, as there is an inherent uncertainty in attempting to quantify the economic value of non-marketed services. Moreover, the costs of the depletion of these services are rarely tracked in local economic accounts. Also, from an ethical and philosophical perspective, ecosystem valuation is far from uncontroversial.

In this sense, the recognition of nature-based solutions as an effective solution for coastal defence is still not widely recognised. During the Portuguese coastal management plan revision, the main difficulty the project faced was to be eligible to apply for the Structural & Cohesion Funds. Technicians and local government staff had to elaborate on how NBS interventions and green infrastructure measures could effectively contribute to coastal management and foster disaster prevention. Initially, NBS were perceived exclusively as "biodiversity protection" measures. With the perception of the value of NBS for coastal resilience and risk prevention, Structural & Cohesion Funds could be activated. A holistic and integrated approach is recommended towards coastal resilience, so that the co-benefits and multi-functionality of NBS measures can be highlighted and properly disseminated.

> OPPORTUNITIES

ReDuna has promoted a strong community involvement from the beginning so that stakeholders could understand and engage in various of the project's activities, ensuring that the users' experience was incorporated in the area's design. The installation of facilities on the dune system, such as raised walkways and signage, enhanced the possibilities for the local population and tourists to interact with the sand ecosystem and get informed about its value and importance.

The project is equally praised by the local population for providing coastal protection and aesthetic values. Beach support-structure owners were also able to ensure economic revenue from the facilities throughout time, benefiting directly from the coastal defence through avoided damage and indirectly from increased tourism. To widen the dissemination of the project, during the first 2 years, the Almada local government shared publications about ReDuna and related results in the municipality bulletins and social networks. The project has also been recognised by UNEP as an example of a successful coastal protection project by providing good practices to achieve SDG 11 (see p. 82 of "Land restoration for achieving the Sustainable Development Goals").

> LESSONS LEARNED

Concerning the policy level, it is of major relevance that the goals of the project are well aligned with regional/local strategies and policies. The main lesson learned in terms of policy making was having the option of nature-based dune restoration for coastal protection recognised in the Regional Coastal Management Plan.

Regarding the project implementation itself, it was relevant to understand that ecological restoration, when properly designed and implemented, is rather invisible, and therefore, the intangible values of biodiversity are usually not immediately recognised. So the tip is to make the landscape restoration changes visible via public awareness and communication campaigns and arrive at a design that is appraisable by the visitors.

It is also important that this typology of NBS is supported throughout by a strong technical and scientific staff, so that the measures to be implemented get continuously adjusted to the territory, from the environmental factors influencing the coastal dynamics and its vulnerabilities to the continuous monitoring works. This makes all the difference for a successful project.

> INSPIRATION FOR OTHERS

The experience of Almada is an extremely useful case for all the Portuguese coastal dunes facing similar erosion problems and coastal flood risk. It also posts a successful example for nature-based coastal dune management worldwide.

In fact, similar dune restoration projects in Portugal are nowadays integrated in the Regional Coastal Management Plans all over the country, in a typology of coastal protection measures.

Almada is a former participant of the International Union for Cooperation - IUC (2017-2020), which enabled the local government to exchange its knowledge with the Chilean City of Viña del Mar, which faces similar coastal resilience challenges. This reinforces the transferability potential of the initiative to other parts of the world.

FURTHER INFORMATION

All factsheets were produced from questionnaires and interviews conducted by the ICLEI team. Contact ICLEI Europe for more information or access Oppla: https://oppla.eu/casestudy/22495

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Adressed SDGs in this factsheet:

GREEN NOISE BARRIER OF SACHSENHEIM, GERMANY

Image: Helix Pflanzen

> OBJECTIVES

The green noise barrier put by the Municipality of Sachsenheim, Germany, in collaboration with the company Helix PflanzenSysteme was initiated in 2014 with the aim of delivering a certified instant green noise barrier. The idea was to create a noise barrier which improved noise mitigation whilst offering other benefits such as managing rainwater flow-off, promoting biodiversity including nesting opportunities and overall an aesthetic structure.

> DESCRIPTION

At the beginning of this project, the possibility of a noise barrier having multiple ecological benefits was not known. This has drastically changed over the past few years and now the local government and residents are much more aware of the potential of nature-based solutions. In Germany, planning for a housing area starts with assessing the noise situation, based on which a decision is made whether noise barriers need to be installed. Additionally, compensation measures are necessary when setting up a housing area: a certain percentage of land needs to be allocated to greening to compensate for the housing area being built. Vertical greening projects can also be considered as compensation measures, hence the green wall could be put in place to act as a noise barrier and count towards compensating the housing development. Therefore, instead of using other material sources, the city council decided on using the budget on a green noise barrier.

The green noise barrier was procured from the regional SME Helix PflanzenSysteme, who pioneer vertical nature-based solutions. The chosen product provides a vertical green habitat of 557 m^2 and 49 m^2 floor size and is mainly planted with Hedera helix. This ivy covers the wall well, offering a green coverage throughout the year. In addition, Parthenocissus quinquefolia, a creeper, is used mostly on the roadside, which adds another layer of leaves in summer. Towards the residential area, there are different flowering perennials. The vegetation is a source of food and shelter for birds, insects and other pollinators, particularly flowering periods. Due to aesthetic specification by the city council of Sachsenheim no emphasis was laid on specific habitat types. Yet, this type of green noise barrier can be adapted to suit local needs and purposes, e.g. the vegetation can be chosen specifically to attract certain target species. Apart from that, the wall also cools its immediate surroundings via evapotranspiration in plants and is irrigated by using the rainwater collected from nearby buildings such as a supermarket. Usually, water shortage is not an issue, since the collected rainwater is ample which is stored for use in times when there is a water shortage.

The maintenance of the green noise barrier is shared: Helix PflanzenSysteme, who provided the technical expertise, does one part while the city does the rest with budget from the greening department. Overall, this is a nature-based solution with multiple benefits and is an innovative, aesthetic and easy to replicate product in other communities.

> CHALLENGES

The quality of the maintenance as well as its costs have been an issue. There is a lack of willingness by the city to pay for professional services to maintain the noise barrier, which leads to ill management of the green wall. There have been accounts when much of the greenery was cut down and the wall had almost no leaves during the winter months, due to lack of proper care and maintenance.

> OPPORTUNITIES

It is important to point out that there was political buy-in right from the start and the local government wanted to see this project go through. One major supporting factor for the design, planning and implementation of the green noise barrier in Sachsenheim was the support and willingness to commit by the person in charge at that time, who was convinced of the added value of the ecosystem services such a nature-based solution offered.

> LESSONS LEARNED

As in Germany, the decision for constructing noise barriers has to be taken before developing new housing areas or individual residential complexes, such a nature-based product has an easy entry point already. However, this green noise barrier was made possible by the political support garnered at the time of decision-making. It is also important to note that a water supply for irrigation is ensured, e.g. by using rain-water. Such synergies need to be planned and implemented to actively use this sustainable source of water. Another element which came into play was the acquisition of a professional maintenance service from the start to ensure consistency in the multiple purposes of the green noise barrier, in terms of providing a habitat for birds and insects, regulatory ecosystem services like cooling as well as noise mitigation itself.

> INSPIRATION FOR OTHERS

This nature-based solution can be applied in given that the same laws apply for noise mitigation for developing new housing areas. One other major factor to keep in mind is the provision of rainwater management in the surrounding area to ensure irrigation of the green noise barrier since water shortage can usually pose a challenge for the successful implementation and especially maintenance of such a project. When it comes to implementing noise barriers next to train tracks, it might be more difficult to establish green noise barriers dueto the high speeds of trains, which lead to faster air flow and major disturbances to the ecosystem of such a green noise barrier.

Image: Helix Pflanzen

FURTHER INFORMATION

All factsheets were produced from questionnaires and interviews conducted by the ICLEI team. Contact ICLEI Europe for more information or access Oppla: https://oppla.eu/casestudy/21938

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BIOTOPE CITY VIENNA

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Image: The Brick/ SoraVie

> OBJECTIVES

Like many other cities, Vienna has to tackle increased heat stress and air pollution as well as a growing population in many neighbourhoods. The local Biotope City Foundation wanted to support the city by creating a real Biotope City: this concept is based on the sum of flora, fauna, and humans, which understands dense cities as an extension of nature and not as something detached.

Biotope City Vienna is now one of the most remarkable projects of the International Building ExhibitionVienna 2022: it shows how urban greening can be used to adapt to climate change impacts such as heat stress whilst at the same time being affordable enough to offer social housing (²/3 of the flats).

> DESCRIPTION

Biotope City is the world's first official climate-resilient district, with an approximate area of 7 ha. It is located on the property of a former Coca-Cola company in the south of Vienna, Austria. The district offers 950 housing units of various shapes and sizes of which two thirds are affordable social housing. “Green for all” constituted an important pillar of the project from the very beginning to ensure all residents had access to good quality urban nature.

Another pillar of the district’s development is its climate-optimised design, which was made possible through the planning software GREENPASS: The orientation of the buildings was planned to provide optimal shading and wind circulation, supported by the abundance of green spaces (2.5 ha of green area on the ground and 11.1 ha leaf area), which cools down the air flows. Overall, a native species vegetation with different structural forms was prioritised. From the start of the project 10 metres high trees of 18-20 different species were planted. Their location was chosen wisely to provide the best shading performance. Several different types of nature-based solutions were installed throughout the district, including: large-scale green roofs, green facades, artificial wetlands, and water ponds for rainwater retention.

According to the GREENPASS analytical models, the wind stays in the district for around 2-3 minutes; in that time all the nature-based solutions cool down the wind flow through evapotranspiration and the shade-optimised architecture, reducing the air temperature by up to 2.2°C. Other benefits include the on average 33% decrease in water run-off and more than twice the average carbon sequestration on a typical heat day compared to the same area without these nature-based solutions.

Another important pillar in the re-design of the district was to promote a mixed and varied usability of the public space to increase the comfort of the residents. The idea was to create a lively zone through public communal areas with generous space for playing, sport, leisure, and urban gardening across all buildings. Private and communal areas such as roof gardens, pools, or greenhouses offer opportunities to meet and mingle that are highly appreciated by the residents.

From the start, a cooperative planning process was carried out by the architects' offices, specialist planners from various disciplines and municipal departments as well as representatives of the property developers and the district,

to discuss the requirements of the project and its future residents. At the end of this process, quality standards were defined and made a compulsory part of the contract between the city and property developers. The case was also supervised by two interdisciplinary R&D projects including social sustainability and neighbourhood management, ensuring residents facilitating their participation in the planning and maintenance stages through events, surveys, etc.

The simple architecture and the recycled construction materials used to build allowed the development project to save money and to invest it in high-quality green spaces. Nature-based solutions represent less than 2% (4 mio.€) of the total construction costs. In addition, they provide a saving of 250.000 € in comparison to conventional structures for the same purpose.

> CHALLENGES

There still is certain reticence in accepting that the way we have built cities so far is not sustainable. People benefit from being surrounded by nature where they live, which generated discussion amongst the many disciplines involved in developing this district. Many did not think that nature and cities could be combined and the lack of experts in certain areas of the planning and construction processes were sometimes felt.

> OPPORTUNITIES

Biotope City Vienna involved six developers, 8-9 architecture and two landscape architect offices. This transdisciplinary team was crucial for the project being successful. There were regular meetings with all the designers, planners, and architects every two to three months to align and support each other.

Administrative regulations often hinder making space for more urban greening and different nature-based solutions, but this was not an issue in this case. On the contrary, it positively affected the implementation of these types of actions since they were going to restore a previously neglected area of the city.

Another stroke of luck was the presence of knowledgeable individuals in this endeavour, who had a strong professional background, a vision and the power to implement it.

> LESSONS LEARNED

Quality control was key in this project as issues can emerge between the design and the construction phase. It is crucial to keep track and to ensure that information is not being lost between implementers and participants throughout the process.

It proved very useful to have a coordinator for the entire project team who kept an oversight of all involved. Often the department responsible for developing such a project does not engage with the maintenance department who is always thinking about saving maintenance costs.

Last but not least, municipalities and investors need to understand that the planning process should be recognised for its important role and be provided with the resources necessary to fulfil it: the built structure will last a hundred years, so taking time to properly plan everything is key.

> INSPIRATION FOR OTHERS

The practical "Biotope City Construction Guideline" is available free of cost for download and was written with the purpose of inspiring other cities to apply this concept. A transdisciplinary team with expertise in many different areas relevant for the construction of the project observed the whole process and explained its path towards success.

FURTHER INFORMATION

All factsheets were produced from questionnaires and interviews conducted by the ICLEI team. Contact ICLEI Europe for more information or access Oppla: https://oppla.eu/casestudy/21373

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GREEN CORRIDORS IN STUTTGART

Adressed SDGs in this factsheet:

Image: Municipality of Stuttgart, Department of Urban Climatology

> OBJECTIVES

Stuttgart, Germany, lies in a natural depression and like other big cities with manufacturing industries, a high volume of traffic, and a population density, they have to find ways of coping with the heat island effect and poor air quality. To overcome these challenges, Stuttgart is implementing a natural green belt strategy to create pathways for winds to sweep down from the hills to ventilate the city.

> DESCRIPTION

The City of Stuttgart faces air quality problems and its location, in a mild-climate valley basin with low wind speeds, aggravates the situation. This led to the development of a Climate Atlas for the Stuttgart region which provides basic information about wind, solar radiation, precipitation, temperature and cold air flows distribution. With this information at hand, the municipality decided to establish a network of corridors that could also help to ventilate the city.

The city's topographic characteristics guided the designation of four pathways. These, mainly green corridors, distribute the air flows coming from different valleys throughout Stuttgart. They facilitate the air exchange in the city, thereby enhancing the potential for cool air to flow from the hills towards the urban areas at basin level. This in turn reduces heat islands from causing thermal stress, and diffuses or prevents air pollution.

This network of corridors requires zoning and regulations to limit real estate and other development along or in the green belts. Inside the city, these pathways are connected to existing parks to reach local neighbourhoods. To ensure the air masses stay cold and clean, the already existing buildings in the wind corridors must respect a minimum distance between them as well as offering cool surfaces such as green roofs, green walls or other similar types of nature-based solutions. The width would ideally be several tens of metres (depending on the volume current density), the regulations make sure this distance is respected.

The municipality can analyse the volumes and speeds of the cold air flow in a model, which allows it to estimate the air exchange rate in the valley basin and the reduction of the concentration of pollutants in the city air. A mean wind speed of 4 m/s as in other big cities dilutes the same emissions more than 1.8 m/s or less in the inner city of Stuttgart, yet Stuttgart can use a natural ventilation in the night with lower emissions (fresh air). The data inputs for the modelling come from a number of stations, one of them is located in the city centre and four to five more will be installed in the future.

Green corridors are particularly beneficial for cooling cities and improving air quality. Yet, they also offer other co-benefits: they promote urban biodiversity, connect surrounding rural and peri-urban areas with the city center, and improve citizens' well-being thanks to the availability of more open spaces.

From the beginning, there was a close collaboration between the Office for Environmental Protection, who analysed the information and provided recommendations, and the City Planning and Renewal team, which allowed a successful implementation of the strategy. The estimated cost of the nature-based interventions amounted to 250,000 € and was funded by the municipal and regional budget.

> CHALLENGES

Competing interests were a great obstacle to this project. Realising the green corridors and ensuring they are not built upon, entails zoning and regulations. This limits real estate and other development along the corridor network, which translates into losing out on potential tax revenues from construction. This requires decision-makers to negotiate the city's priorities.

In addition, the political set-up of the local government influenced how susceptible local policy-makers in the city council were towards the goals of the project and ultimately affected the final decision.

Planners play an important role. However, it was necessary for them to understand and plan for the scale of this project. Usually, they only focus on certain neighbourhoods, but here they needed to widen their horizon and scale of planning for this project.

> OPPORTUNITIES

One of the main success factors was that urban climatic concerns were integrated into city planning. Thanks to this, still today each decision is examined and adapted according to the principles and concepts of the green corridors' cold air regime, based on the Climate Atlas.

> LESSONS LEARNED

It is important to focus on the reduction of emissions (e.g. fewer vehicles, low emission cars), but better ventilation through cold air flows can support the dilution of pollutants. Also, high-quality basic data and information is needed to convince the city planners first and subsequently have a basis on which to showcase the necessity towards the city council.

> INSPIRATION FOR OTHERS

Regions with comparable climate and orographic conditions can apply this green corridor strategy. Other cities, such as Erfurt, Germany, have already implemented a similar system to protect cold air flows. There is potential that this case can be transferred to other locations.

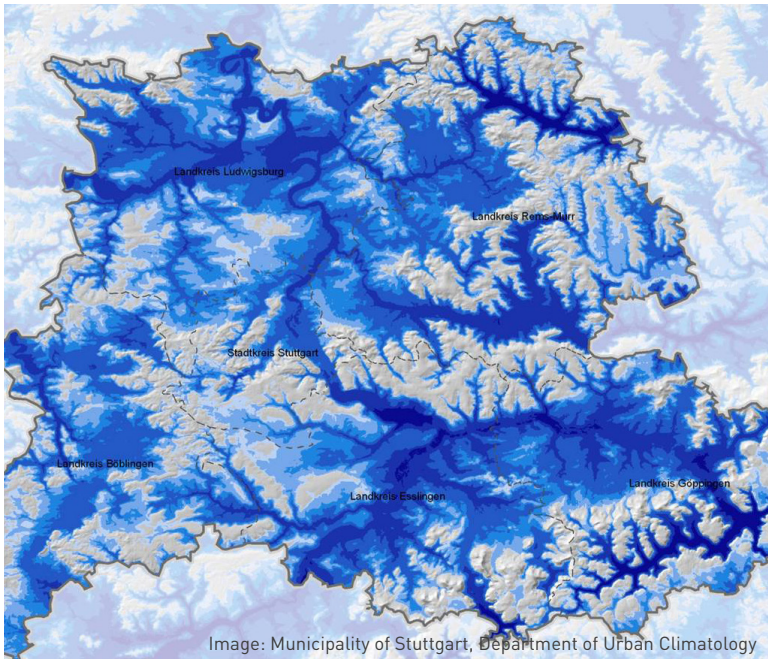

Image: Municipality of Stuttgart, Department of Urban Climatology

FURTHER INFORMATION

All factsheets were produced from questionnaires and interviews conducted by the ICLEI team. Contact ICLEI Europe for more information or access Oppla: https://oppla.eu/casestudy/21264

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REGREEN
NATURE-BASED SOLUTIONS

Adressed SDGs in this factsheet:

RICHWATER®, RECLAIMED WATER FOR IRRIGATION, MALAGA, SPAIN

Image: BIOAZUL

> OBJECTIVES

Water scarcity and low availability present real obstacles to implementing and maintaining nature-based solutions, such as urban agriculture and other peri-urban farming practices. Reclaimed water (i.e. treated wastewater) is an effective and efficient alternative water resource with many associated benefits, for example, providing nutrients that can be directly assimilated by plants. Furthermore, as the availability of reclaimed water is not so much dependent on climatic events, it is readily accessible year round.

> DESCRIPTION

RichWater® is an innovative solution which offers the capacity of treating municipal wastewater and supplying a constant source of nutrient-rich water for use in agriculture. In addition to use in urban and peri-urban agriculture, this solution provides an effluent suitable for irrigating community gardens, parks and green areas, urban forests or vertical gardens. The treatment provided by RichWater® allows the recovery of nutrients (e.g., nitrogen and phosphorus), reducing environmental problems (e.g. eutrophication) due to excesses of such compounds in the water bodies that receive wastewater. By integrating wastewater treatment and irrigation in a single system, this solution offers the possibility of automating and controlling the volume and quality of excess water through the use of sensors. The system is easy to operate and maintain and provides a high-quality effluent beneficial to plants, thus reducing the need for additional chemical fertilizers. Implementing RichWater® contributes to advancing agricultural technology while generating good quality jobs, not only in the design, manufacturing, and commissioning of the systems, but also in the maintenance and operation.

The availability of reclaimed water and its use in agriculture plays a fundamental role in the so-called “rural renaissance”, allowing the conservation of the rural environment and its ecosystem services. Additionally, it facilitates a suitable working environment and promotes the integration of women in agricultural practices, facilitating a just and inclusive social structure in the region. The use of reclaimed water also contributes to the water sovereignty of farmers in areas affected by water scarcity and droughts, since the combination of this resource with more conventional ones can avoid supply cuts and the consequent food production losses. Broad implementation of this system implies a reduction in agricultural demands for drinking-quality water, which in turn allows prioritizing this water for tourism or for industries that require clean water.

RichWater® is one of the best practices on the European Circular Economy Stakeholder Platform (https://circulareconomy.europa.eu/platform), which is a joint initiative by the European Commission and the European Economic and Social Committee to bring together stakeholders active in the broad field of the circular economy in Europe.

The RichWater® membrane bioreactor (MBR) has been verified by the Environmental Technology Verification (ETV), a new tool of the European Commission to help innovative environmental technologies to reach the market by providing sound verification of the technology claims.

The utility company (water operator AXARAGUA), Research Centre CSIC-La Mayora, local and regional authorities, farmers and communities of irrigators as well as local action groups were involved in the implementation of RichWater®.

> CHALLENGES

- Strong dependency on political support, in the context of short-term policymaking. This is a problem as longer implementation

periods and long-term commitment from the public sector are required.
- Lack of knowledge in the public sector on NBS available on the market, lack of evidence of the effectiveness of NBS in addressing existing challenges, and lack of studies on economic feasibility and return of investment for NBS projects, products or services.
- Strict regulation and controls on wastewater treatment and reuse.
- Public perception: farmers have also shown reluctance to using reclaimed water.
- Difficulty in using public procurement, private public partnerships for such projects.
- Lack of knowledge of market opportunities and successful business cases.
- Lack of finance/funding opportunities for research and development.
- Lack of own financial resources by the municipalities. External support is needed, and this is normally used to invest in more conventional infrastructure, where risk of not getting the return on the investment is lower. Innovative approaches are generally considered high risk operations.

> OPPORTUNITIES

- Emerging planning legislation/regulations/strategies supporting nature-based design.
- Strong partnerships and/or networks in the sector.
- Good mechanisms to share knowledge and technologies in the sector.
- Financing opportunities given by the European Investment Bank and other private entities.
- R&D and innovation projects, initiatives which are delivering the needed evidence and business cases on NBS.
- Support regulatory framework: Water Framework Directive, Regulation 741/2020 on minimum requirement for water reuse in agriculture, Biodiversity Strategy, Green Deal and Circular Economy, Common Agricultural Policy (CAP) which will allow for the mobilization of significant funds to support activities on agroforestry, development of an agriculture that includes ecosystem services and the promotion of multifunctional agricultural activities. In this framework, some actions contemplated by NBS, such as soil conservation practices, agroforestry systems or sustainable agricultural practices, can be financed through this instrument and provide incentives.
- Global initiatives such as the Agenda 2030 in the context of Climate Change.

> LESSONS LEARNED

While the technology and knowledge to implement projects using reclaimed water is already available, acceptance from the public and health authorities is still a determining factor. Support from local government and farmers should also be considered from the outset of the project. As such, a bottom-up approach with the participation of all actors in the value chain is essential in determining the success of the implementation. On top of that, there is a lot of bureaucracy associated with obtaining reuse permissions and the procedures and competences of relevant authorities are sometimes unclear.

It is important to prepare a strong and comprehensive business model, putting special emphasis on the value proposition and clearly quantifying the return on investment, especially the financial return and other social-environmental impacts. The financial aspects of the solution is a key element to convince stakeholders, especially potential investors. It is therefore crucial to have a business case, well described and assessed in order to convince investors.

> INSPIRATION FOR OTHERS

The applicability of RichWater® is considerably higher in water scarce regions of Europe and the MENA countries, especially in areas where agriculture plays a key role in the economy. The support of stakeholders from the quadruple helix (e.g., farmers and consumers, local government, etc.) is strongly recommended for a successful implementation. In addition, to facilitate the transferability and market uptake of RichWater®, the system has been validated within the EU Environmental Technology Verification (ETV) Pilot Programme. The increasing commitment of the City of Málaga for climate change adaptation, SDGs, Global Covenant of Mayors for climate & energy, etc. created a fertile environment for nature-based entrepreneurship, like Bioazul, the creator of RichWater, to flourish. For example, the recovery plan for the city of Málaga after COVID-19 (Plan de Reactivación de Málaga) includes actions in the short-medium term which support such businesses.

FURTHER INFORMATION

All factsheets were produced from questionnaires and interviews conducted by the ICLEI team. Contact ICLEI Europe for more information or access Oppla: https://oppla.eu/casestudy/21253

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REGREEN
NATURE-BASED SOLUTIONS

GREEN LIVING ROOM LUDWIGSBURG

Adressed SDGs in this factsheet:

Image: Helix Pflanzen

> OBJECTIVES

The Green Living Room is a nature-based solution that can be applied to various urban situations whilst offering manifold benefits for the urban environment in terms of climate change adaptation, public realm improvement and nature awareness. In Ludwigsburg it was applied as a multifunctional structure that contributes to addressing urban environmental and societal challenges. It helps regulate the urban heat island effect by evapotranspiration of leaves and shading, promotes urban biodiversity net-gain, reduces storm water run-off, fosters the reuse of rainwater by building on a sustainable irrigation system, and enables air purification. City residents also get the chance to directly interact with nature, which contributes to raising awareness towards the integrated delivery of ecosystem services.

> DESCRIPTION

In 2013, a competition was launched amongst German cities for the installation of a Green Living Room within urban boundaries. The city of Ludwigsburg in Germany has quickly reacted, flagging their interest. As Ludwigsburg has a baroque city centre, local authorities were inclined to engage on a quest for greening its urban areas. Therefore, the installation of a multifunctional device in a central area seemed quite attractive for decision makers as an innovative way to raise the citizens' contact with greening structures in the city.

With the academic support of a local university and the work of the nature-based enterprise Helix Pflanzen, the local government launched a local process to identify potential locations for the Urban Living Room by using a geographic information system (GIS) software, and also by considering climate adaptation demands and the city's unique architectural situation. Finally, a decision was made to place the Green Living Room in an inner city central market square, located close to the city hall. The Green Living Room is formed by green wire-cube modules forming a set of living walls with a variety of plants.

Today, years after its completion in 2014, the Urban Living Room can definitely be considered a successful nature-based solution due to its assertive architectural design, high quality of implementation and realistic maintenance mechanism. The success of the multifunctional structure is also reflected by the fact that until these days there were hardly any vandalism incidents. This Green Living Room regularly receives many visitors. City residents and tourists are attracted by the lush experience to access plants at eye level and feel the scent of the flowers, which provides a quite a sensorial experience. The Urban Living Room has a flowering duration from spring to fall (March to October), which adds to a colorful picture and raises the attractiveness for insects and pollinators during most times of the year. Green coverage is safeguarded all year long by the use of evergreens such as ivy. To keep the Urban Living Room fresh and green, maintenance works are carried out by Helix Pflanzen, who were the designers of the device.

Back in 2014, a local planning company accompanied the construction process of the wire-cube modulated structure covered by plants, whose duration was approximately 6 weeks with the engagement of 6 to 8 employees. In 2019, the structure got an addition in area of 25%, following a request by the City of Ludwigsburg, who also provided chairs for people to sit close to the structure and cherish the

pleasant microclimate. The green walls of the Green Living Room could also act as a noise barrier, considering that its substrate is wide enough. However, because the loud street is located far away from this central plaza, the area has no noise issues. In any case, if applied to a different urban setting with a demand for noise absorption, the Green Living Room can also effectively perform as a noise barrier.

The Green Living Room can also be designed as a "Mobile Green Living Room" equipped with an onboard water tank, which can be easily transported via truck and installed in different urban environments.

> CHALLENGES

Usually procurement processes hardly consider nature-based solutions. Therefore, there is a need for political buy-in so that such a structure can be developed and implemented. It is often a matter of how much risk local government staff are ready to take to engage in innovative greening solutions. Therefore, individual support from within the administration is essential. Another point that can become a limiting factor for the installation of the structure is a high level of care associated with the choice of vegetation, related pruning works and monitoring of the irrigation system. By designing the Urban Living Room with a seasonal character, less maintenance is required. In central locations, the demand for pruning is usually higher. The structure may additionally offer opportunities for educational classes.

> OPPORTUNITIES

A major supporting factor for the implementation of the Urban Living Room was an open attitude within the Municipality towards experimenting with the design of the structure and vegetation set-ups. The Municipality has a climate adaptation plan which was in line with the delivery of such a structure for microclimate regulation. Therefore, early political buy-in made things happen, while this was corroborated by the positive response of city residents, who make good use of the structure. Finally, water savings were a supporting factor, as the Urban Living Room has an irrigation system that operates with rain water.

> LESSONS LEARNED

Foreseen guided tours and school kid excursions to the Urban Living Room did not really take place so far. So a lesson learned is to engage with the city's education department to promote school trips to the structure so that children can learn about the multiple benefits that arise from providing nature-based solutions within city centres. Another lesson learned is that it would have been advantageous to engage nature conservation groups from the beginning of the planning process to ensure their buy-in and related dissemination of biodiversity net-gain opportunities and co-benefits. Finally, it would have been interesting to systematically monitor the cooling effect of the structure, and compare it to other urban green structures in terms of microclimatic performance, making a report of how the Urban Living Room performs during the different seasons.

> INSPIRATION FOR OTHERS

The Urban Living Room is a modular system, whose upscaling is absolutely feasible. Considering its high multifunctionality and the fact that it doesn't require a large space for installation, it can be applied to an enormous variety of public (and private) spaces in cities within Europe and beyond. If local authorities are still not sure about committing to the implementation of such a structure in their public spaces, an alternative would be to adopt a "mobile" living room to test its effectivity, civic performance and contribution to raise residents' well-being for a certain period of time before deciding to install an Urban Living Room.

FURTHER INFORMATION

All factsheets were produced from questionnaires and interviews conducted by the ICLEI team. Contact ICLEI Europe for more information or access Oppla: https://oppla.eu/casestudy/17555

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