TRANS

lighthouses

MORE THAN GREEN

Lighthouses
of transformative
nature-based solutions
for inclusive communities

Funded by
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NBS pilot implementation plan

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Purpose of deliverable

Roles and objectives in relation to other work packages

The purpose of this deliverable D5.2 "NBS pilot implementation plan" is to collect the efforts undertaken by the pilots during the task 5.2 Agile co-design of the NBS for pilot cases (M06- M20 - The deadline of the deliverable has been postponed to M20 from M18). Such efforts are directed to the co-design and the definition of the implementation plans of the NBS solutions for each pilot. It builds on task 5.1 "From communities to Living Knowledge(s) Labs for new models of NBS governance" and prepares task 5.3 "Co-Implementation and management of the pilots (M16- M42)" and task 5.4 "Ongoing evaluation process". The objective is to set out the implementation plans for the pilots, as they are defined by the activities undertaken, in a participatory way, by the LKLabs in each pilot.

Executive Summary

This report provides a comprehensive analysis of the co-design processes implemented under the TRANS-Lighthouses project, emphasizing the integration of Nature-Based Solutions (NBS) to address ecological, social, and cultural challenges in urban, coastal, forestry and rural contexts. The co-design framework fosters collaboration among diverse stakeholders to create sustainable, inclusive, and adaptive solutions within the larger context of the co-creation process deployed in the TRANS-Lighthouses (TRL from now on) project. The report is divided into three main sections, the first one addresses the state of the art on co-design for NBS in participatory process and defines the theoretical flexible framework identified to develop comprehensive Implementation plans for the pilots, subdivided in flexible and adaptable set of "moments" that define the whole process. The second section includes the Implementation plans of the eight TRL pilots, which included their understanding of the different "moments", a Gantt chart, and a diagram explaining their workflow within the co-design phase of the participatory process.
The third section includes a set of reflections on the Implementation Plans, trying to highlight the red threads and the recurrences that can be traced within the Plans.
This report underscores the transformative potential of co-design processes in delivering sustainable and inclusive NBS. By fostering collaboration, addressing stakeholder diversity, and emphasizing flexibility, the pilots showcased innovative solutions tailored to local contexts. The findings offer valuable lessons for replicating co-creation frameworks in diverse settings while addressing shared challenges through adaptive and inclusive strategies.

SECTION I

1. The state of the art on co-design in the co-creation process

In modern design theory, co-creation is deeply rooted in human-centered and participatory design (HCD) principles that emerged in Scandinavia during the 1970s. These approaches aimed to empower those affected by design decisions, advocating for collaborative decision-making. In participatory design today, participants, considered the stakeholders of a certain project, are seen as key resources, contributing valuable expertise (Mattelmäki & Visser, 2011). Ehn (2008) describes this as a shift towards recognizing individuals as "co-designers" in the process. Although 'Co-design' has also been referred to in the literature as 'co-creation' and 'co-production' with these terms often used interchangeably (Vargas et al., 2022), co-design and co-creation, while related, are distinct in scope and application. For instance, Lee et al. (2024) highlight co-design as central to public space design, involving users and designers in a collaborative, bottom-up process. It emphasizes gathering diverse inputs and prioritizing community benefits. Co-design involves gathering diverse expertise and knowledge inputs, often leading to more inclusive design outputs. It places particular emphasis on the process itself, with terms like "collaborative process" and "bottom-up process" frequently highlighted. Co-design is typically centered on the planning phase and encourages social benefits through community involvement. For the EU Horizon 2020 project RECONECT[1] (2023), focused on NBS participatory creation, co-creation is broader than co-design and spans the full development of a project. The RECONECT guide provides a seven-step pathway that includes defining goals, identifying stakeholders, selecting tools, implementing, and monitoring solutions. This model tries to ensure ongoing adaptation and feedback, emphasizing inclusivity and transparency. Co-creation processes enhance community engagement, foster partnerships, and support the creation of resilient and sustainable spaces whereas co-design is a phase that focuses on engaging stakeholders actively in the design process. It includes activities such as brainstorming, creating scenarios, and iterating designs based on feedback. In NBS, co-design emphasizes the alignment of community needs with ecological and social goals, making it a critical step for integrating local knowledge and preferences. Nevertheless, in the context of the European funded projects such as TRANS-Lighthouses, it is widely recognized that co-creation is the larger umbrella under which co-design constitutes a step, and this approach builds on the vision created in the URBINAT[2] project (2021), namely the progression of the steps of co-creation into co-diagnostic, co-design, co-implementation, co-monitoring. In such a way the process of co-creation is assumed to be within this project, and this specific deliverable addresses the aspects of co-design developed in T5.2 and encapsulated in the Implementation Plans provided by each of the pilots in Section II.

1.1 Co-design for NBS

The state of the art highlights the role of co-design for NBS as a participatory approach where diverse stakeholders collaborate to align ecological, social, and cultural objectives within the design process (Brill et al. 2022). Co-design, as defined by Lupp et al. (2021), "should be open-ended with a strong component of understanding, learning, and co-production of knowledge," and therefore should emphasise inclusivity and integrate local knowledge to address environmental challenges while promoting environmental, cultural, social and economic sustainable territorial development. The key features on co-design for NBS deal on one hand, on the assumption of participatory cornerstone which is rooted in Human-Centred Design and Participatory Design traditions (Mattelmäki & Visser, 2011), co-design invites stakeholders at large, such as communities, policymakers, and experts to imagine solutions tailored to local contexts. Secondly, it is pivotal an alignment of NBS objectives: NBS co-design processes aim to deliver multifunctional benefits,

[1] http://www.reconect.eu/
[2] https://urbinat.eu/

such as climate adaptation, biodiversity enhancement, and social well-being (Raymond et al., 2017). Additionally, the definitions of frameworks and tools is identified as a relevant aspect of co-design for NBS and European projects like RECONECT and URBiNAT outline structured frameworks for co-design within broader co-creation cycles, involving phases like co-diagnosis, co-design, and co-implementation (URBiNAT, 2019a; Frantzeskaki, 2019). Activities include methods and tools, such as scenario planning, ideation workshops, and prototyping (more about the methods for co-design will be discussed in the D6.8) to support the alignment of the community priorities with ecological needs. Furthermore, literature review highlights how crucial is the idea of both disciplinary collaboration between research and practice (Wickenberg, 2023). and multi-, inter-, and transdisciplinary collaboration (Davids et al., 2024) among different fields. Co-design needs to integrate fields such as urban and rural planning, environmental science, and social sciences, among others, to foster innovative solutions that are resilient and adaptable. Finally, the importance of case studies and pilots projects results clear, projects like Connecting Nature[3], GrowGreen[4], URBAN Greenup[5], Urban nature labs[6], CLEVER cities[7], ProGIreg[8], have successfully applied co-design for NBS, such as green/blue infrastructure, emphasising stakeholder engagement to ensure relevance and long-term success.

1.2 Aspects of Co-design for NBS

Within the frame of TRANS-Lighthouses it is pivotal to address the following aspects when dealing with the co-design for NBS, such aspects are encompassed in the Implementation Plans provided by the pilots:

1.2.1 Framing the context (Co-diagnostic and ideation)

Framing the context represents the foundational step in the co-design process, establishing a shared understanding of the challenges, opportunities, and objectives among stakeholders. This phase begins with co-diagnostic activities, where diverse participants—such as community members, municipal authorities, and technical experts—come together to identify the social, ecological, and economic issues relevant to the project. Using tools like participatory mapping, workshops, and surveys, stakeholders analyze the local environment, cultural dynamics, and resource constraints. This shared diagnosis fosters a mutual appreciation of the complexities involved and sets the stage for collaborative problem-solving. Ideation, which follows the diagnostic phase, focuses on brainstorming innovative solutions that address the identified challenges. This creative phase encourages stakeholders to think beyond conventional approaches, incorporating local knowledge, historical insights, and cutting-edge methodologies to propose ideas that resonate with the community's aspirations and ecological needs. The ideation process often employs methods like scenario planning, storytelling, and visualization to explore diverse possibilities. By embedding inclusivity and adaptability at its core, this step ensures that all voices are heard and that the resulting solutions are context-sensitive and forward-thinking.

1.2.2 Participatory Budgeting Process

The participatory budgeting process is a critical step in empowering stakeholders by involving them directly in financial decision-making. This step translates the co-created ideas into actionable plans by allocating resources transparently and democratically. Stakeholders, including residents, organizations, and policymakers, are invited to propose, discuss, and vote on funding priorities for the proposed Nature-Based Solutions (NBS). Through methods such as community forums, digital voting platforms, and facilitated discussions, this process fosters a sense of ownership and accountability. Participatory budgeting serves multiple purposes: it ensures that financial resources are directed toward projects with the highest community impact, builds trust among stakeholders

[3] https://connectingnature.eu/
[4] https://growgreenproject.eu/
[5] https://www.urbangreenup.eu/
[6] https://unalab.eu/en
[7] https://clevercities.eu/
[8] https://progireg.eu/the-project/

by demonstrating transparency, and educates participants about financial constraints and trade-offs. By enabling direct involvement in budget allocation, the process strengthens civic engagement and aligns financial investments with the community's needs and priorities, ensuring that NBS implementations are both relevant and sustainable.

1.2.3 Identification of the most appropriate NBS / NBS supporting tools

Selecting the most suitable Nature-Based Solutions (NBS) and supporting tools is a pivotal phase that bridges co-diagnostic insights with actionable implementation strategies within the co-design phase. This step involves a comprehensive evaluation of potential NBS options considering their environmental, social, cultural, and economic feasibility. Stakeholders collaborate to assess each option against the local context. Supporting tools, such as Geographic Information Systems (GIS), hydrological models, or participatory decision-making platforms, play a vital role in this step. These tools enable data-driven decision-making, simulate potential impacts, and provide visual aids that help stakeholders understand the trade-offs and benefits of different solutions. The process emphasizes adaptability, ensuring that selected solutions and tools are scalable, cost-effective, and aligned with long-term sustainability goals.

1.2.4 Co-design of NBS as a Product and as a Process (Material and Immaterial)

The co-design of NBS as both a tangible product and an intangible process represents the creative and integrative heart of the co-design journey. This dual focus ensures that NBS not only provide physical solutions but also foster socio-cultural benefits like community cohesion, education, and well-being.

Material co-design involves the technical and aesthetic aspects of creating the physical components of NBS. This includes decisions on plant species, infrastructure layout, and design elements that enhance functionality while harmonizing with the local landscape. Stakeholders use prototyping, modeling, and iterative feedback sessions to refine these designs, ensuring alignment with ecological and community goals.

Immaterial co-design, on the other hand, focuses on the processes and relationships surrounding the NBS. This includes defining maintenance strategies, creating educational programs, and fostering behavioral changes that support the long-term success of the solutions. Immaterial aspects also address governance structures, such as co-management agreements or participatory monitoring systems, ensuring that the solutions remain adaptive and inclusive over time. By balancing these material and immaterial dimensions, co-design ensures that NBS delivers holistic and enduring impacts.

1.2.5 Territorial impact of the NBS (Urban, Coastal, Rural, Forest)

Evaluating the territorial impact of NBS is another relevant aspect of the co-design process, focusing on how the implemented solutions influence their broader ecological, social, and economic contexts. This step recognizes the diversity of landscapes involved—urban, coastal, rural, or forested—and tailors the analysis to the unique characteristics of each setting. This step employs tools such as environmental impact assessments, socio-economic surveys, and remote sensing to measure outcomes. Stakeholders are engaged to provide qualitative feedback, ensuring that the analysis captures both measurable results and lived experiences. By comprehensively evaluating the territorial impact, this step ensures that NBS contribute meaningfully to local and regional sustainability goals while offering transferable insights for similar contexts globally.

1.3 Challenges, risks, and issues in co-designing for NBS

Co-designing Nature-Based Solutions (NBS) involves a multifaceted process that seeks to harmonize ecological objectives with social and cultural needs. While this approach fosters inclusivity and collaboration, it also presents a variety of challenges, risks, and issues that require careful navigation.

Stakeholder Engagement: Inclusion and Trust

One of the foremost challenges lies in ensuring meaningful and inclusive stakeholder engagement. Co-design processes often involve diverse groups, including community members, policymakers, technical experts, and private entities. Balancing these voices can be complex, as varying priorities, expertise levels, and interests may lead to disagreements or power imbalances (Sanders & Stappers, 2008). For instance, influential stakeholders may dominate discussions, marginalizing underrepresented groups. Additionally, a lack of awareness or mistrust in participatory processes can hinder active involvement, particularly in communities unfamiliar with or skeptical of collaborative approaches (Lupp et al., 2021).

The voluntary nature of participation further complicates engagement. Stakeholder fatigue—arising from prolonged or repetitive activities—can lead to reduced commitment, especially when immediate benefits are not apparent. High turnover among participants, such as students, elected representatives, or transient residents, exacerbates this issue by disrupting continuity and institutional memory (Brill et al., 2022).

Governance and Policy Alignment

Governance issues are another significant hurdle in co-designing NBS. Misalignment between the goals of participatory processes and existing policy frameworks can impede progress (Frantzeskaki, 2019). Traditional top-down governance models often resist integrating collaborative and innovative approaches like NBS, favoring conventional solutions due to regulatory inertia or vested interests. For example, in contexts where local authorities are accustomed to centralized decision-making, introducing co-governance models may face resistance or delays (Davids et al., 2024).

Conflicting priorities among different governmental departments or agencies further complicate governance. Budget constraints, bureaucratic inefficiencies, and fragmented decision-making create obstacles to aligning agendas and allocating resources effectively. These challenges are particularly acute in projects requiring interdisciplinary collaboration, where sectoral silos must be broken down to foster integrated planning and execution (Raymond et al., 2017).

Communication Barriers

Effective communication is critical to the success of co-design, yet it is often fraught with barriers. Misaligned expectations among stakeholders can result in frustration and disillusionment. Language barriers, whether linguistic or rooted in technical jargon, can alienate participants, particularly those from non-expert backgrounds (Mattelmäki & Visser, 2011). Ineffective feedback loops, where participant input is not visibly integrated into decision-making, risk eroding trust and discouraging further engagement (Lupp et al., 2021).

In some cases, inadequate dissemination of information—such as unclear agendas or last-minute invitations—undermines participation and collaboration. A lack of transparency in processes or outcomes can also foster skepticism, particularly when stakeholders perceive decision-making as opaque or pre-determined (Sanders & Stappers, 2008).

Resource Constraints and Ecological Challenges

The implementation of NBS is often constrained by limited financial and human resources. Securing adequate funding for design, execution, and long-term maintenance is a persistent challenge. The high upfront costs of NBS, combined with their long-term benefits, can make them less appealing to budget-conscious stakeholders (Brill et al., 2022). In addition, accessing and sharing relevant data, such as hydrological or biodiversity assessments, may be difficult, delaying progress and reducing decision-making efficacy (Davids et al., 2024).

Ecological and physical constraints also pose risks. For instance, urban settings with limited green spaces may face challenges in integrating NBS without significant land-use trade-offs. Poor soil quality, high urbanization, or climatic conditions may limit the effectiveness of certain solutions, such as rain gardens or urban forests. In rural or forested areas, considerations like biodiversity preservation and land rights further complicate implementation (Frantzeskaki, 2019).

Cultural and Behavioral Barriers

Cultural attitudes and behavioral biases can subtly but significantly impact the co-design process. In some communities, there may be a lack of interest or awareness about nature conservation or climate adaptation (Lupp et al., 2021). Misconceptions about the risks or benefits of NBS—such as

fears of attracting pests with green spaces—may deter public support. Additionally, cultural resistance to participatory methods, where communities are accustomed to top-down decision-making, can impede collaboration (Mattelmäki & Visser, 2011).

Time and Process Complexity
Co-designing NBS is inherently a time-intensive process, requiring iterative discussions, continuous feedback, and careful alignment of stakeholder agendas. The complexity of coordinating large, diverse groups often leads to delays, particularly when unforeseen challenges emerge. Balancing the need for thorough engagement with project timelines is a delicate task, as rushing can compromise inclusivity, while prolonged processes may test participant patience and resource availability (Sanders & Stappers, 2008).

1.4 Definitions

In this section we provide an overview of the definitions of some of the terms that will be used in this deliverable as they are understood by the TRANS-Lighthouses project:

Co-creation: Generally, co-creation refers to the process of participation, interaction, collaboration or co-production of NBS with citizens (organized or unorganized), political representatives, public officers, private stakeholders and researchers. However, a variety of approaches exist to co-create NBS. Depending on the given challenges, time and available resources, projects can follow existing concepts that systematically structure and provide guidance throughout the co-creation process. Within TRL co-creation consists of four steps, namely co-diagnostic, co-design, co-implementation, and co-assessment.

Co-governance: It refers to "processes and structures of public decision-making and management that engage people [...] across the boundaries of public agencies [and] levels of government"[9]

Co-design: Co-design refers to a collaborative approach to design where all the stakeholders—including end users, designers, and other relevant participants—actively contribute to the design process from its conception to its implementation. This methodology emphasizes collective creativity and democratic participation, ensuring that the final outcome addresses the real needs, insights, and desires of the people it impacts. According to Sanders and Stappers (2008), co-design evolved from participatory design and is rooted in the belief that those affected by design decisions should have an active role in shaping the outcomes. It positions end users and stakeholders as "experts of their experiences," making their involvement central to producing solutions that are more innovative, inclusive, and appropriate to the context in which they will be used.

Participatory design: Participatory design is an approach that actively involves all stakeholders, especially end users, in the design process to ensure that the solutions developed are practical and meet their needs. Originating in Scandinavia during the 1970s, this method is grounded in democratic values, emphasizing the importance of user input and shared decision-making. In participatory design, users are not just consulted but are co-designers, offering valuable expertise from their lived experiences, which enhances the relevance and usability of the design. Ehn (2008) describes it as a process where "people participate in the design process as co-designers," highlighting its focus on collaborative creation and empowerment of participants.

Implementation Plan: An implementation plan in a co-creation process is a structured framework designed to guide collaborative efforts between stakeholders, such as communities, institutions, and experts, toward achieving shared objectives. It outlines specific activities, roles, resources, and timelines while emphasizing flexibility, inclusivity, and continuous stakeholder engagement. Such a plan ensures that diverse perspectives are integrated, promoting shared ownership and fostering innovative solutions. It also includes mechanisms for managing challenges, monitoring progress, and evaluating outcomes to maintain alignment with co-created goals.

[9] Sebastian & Jacobs, 2021:1302

2. “Moments” in co-design process

Given the wide variety of typological conditions - policies, plans and projects - of scale and context - rural, urban, forestry, and coastal - that characterize TRANS-Lighthouses NBS actions, we have attempts to envisage process structures that are able to respond flexibly to the needs of different Pilots. Indeed, this diversity of conditions requires that the process itself is not designed to be predictive, but rather to be as adaptable as possible to all cases. For all these reasons, we have based our thinking on the RSVP Cycles method (Halprin, 1969) developed by the American landscape architect Lawrence Halprin.

The RSPV Cycles
In 1969 Lawrence Halprin arrived at the final conceptualisation of the 'RSVP Cycles', his decoding of the creative process as a collective act. The method, which Halprin describes in his monograph *The RSVP Cycles, Process in the Human Environment,* is based on the interaction of four moments: Resources, Score, Valuaction and Performance.

- Resources (r) represents the collection of available elements, i.e. the initial conditions or resources, understood as both material facts and immaterial values.
- Score (s) is the transcription of the process, a set of graphic notations necessary to invent, organise and communicate an action.
- Valuaction (v) stands for critical evaluation. The term is a combination of value and action, emphasising the active aspect of this phase. Different alternatives are evaluated and comments and observations are encouraged.
- Performance (p) is the way in which the intentions of the project are realised.

The most interesting aspect of Halprin's method lies in the organisation and relationships between the different moments of the creative process: for the author, the four moments - R, S, P, V - do not follow a sequential order. Instead, they can lead to infinite configurations. Performance, understood as a transformative action (whether temporary or permanent) on a place or a relationship, can occur at the beginning of the creative process rather than at the end. The cycle can begin at any point and unfold in any direction. The real innovation of the method therefore lies in the interrelationships between the four moments.

2.1 Methodology related to the Implementation Plans development and analysis

The process leading to the formulation of the implementation plans for the eight pilot projects, as documented in the annexes of this deliverable, has been both extensive and iterative. The initial phase involved a thorough examination of the roadmap developed by BRX and CES for Task 5.1 “From Communities to Living Knowledge(s) Labs for New Models of NBS Governance.” This roadmap systematically outlined the sequential steps associated with the four key phases of co-creation: co-diagnostic, co-design, co-implementation, and co-monitoring. Previously, this roadmap served as a guiding framework in Task 5.1, assisting the pilot cases in formalizing their Living Knowledge Lab (LKL). The outcomes from this process were subsequently integrated into Task 5.2 and, in turn, influenced both the analysis presented in Deliverable 5.2 (D5.2) and the implementation strategies of Task 5.3 “Co-Implementation and Management of the Pilots.”

During Task 5.2, UNIROMA1 refined and expanded the roadmap to further elaborate on the distinct “moments” that are critical to the co-design phase of the co-creation process. These moments, which are detailed in the subsequent paragraph, served as the foundation for structuring the Implementation Plan. The proposed structure was then presented to the pilot projects, inviting them to document their activities corresponding to these moments, capturing both past actions

and future plans. Given that each pilot was at a different stage of development, the degree to which they were able to comprehensively complete the Implementation Plan varied accordingly.

Following the submission of the initial drafts, UNIROMA1 conducted a series of bilateral meetings with each pilot case to collect feedback from the pilots in order to address the difficulties and challenges encountered in drafting their plans. This process facilitated a second iteration, during which pilots received targeted custom input from UNIROMA1 and were asked in turn to clarify specific aspects of their Implementation Plans – an action that ignited a second round of feedback collection. After incorporating these new refinements that were subsequently recommended by the UNIROMA1 team, the pilot cases formally submitted the final versions of their proposed implementation plan. These finalized plans formed the basis of the textual analysis undertaken in this task, the findings of which are elaborated below, in Section II of this document.

2.2 Lists of "moments" in the Implementation Plan

To encompass the circularity, iterative form, agility, and flexibility of Halprin's understanding of the creative process we enlisted and presented the pilots a set of different "moments" that could be included in their co-creative process. The Pilots were presented with the following set of "moments" with a clarification that those were not prescriptive, but rather a suggestion of what a co-creative process could entail. They were given directions to address or disregard any of the "moments", invert or merge them according to what was happening or they expected to be happening in the future, add other moments that were specific to their context and process and so forth.

Co-define Pilot Challenges and Goals
Co-defining challenges and goals is a collaborative approach used to ensure that all stakeholders involved in a project have a shared understanding of the problems to be addressed and the objectives to be achieved. This process is fundamental in co-design and participatory design methodologies, where the active involvement of users and other stakeholders is crucial for the success of the project.

List of NBS examples
Providing a list of Nature-Based Solutions (NBS) examples to stakeholders in co-design offers several benefits, enhancing the effectiveness, engagement, and overall success of the project. It helps enhance the understanding of the issue and an informed decision-making process. It is important to focus on the contextual relevance of the examples used to mitigate the risk of leading the stakeholders to a different understanding of the NBS relevant for the pilot.

Co-diagnostic activities
Co-diagnostic activities are collaborative processes where stakeholders collectively analyze and identify key issues, needs, and challenges within a specific context. These activities involve gathering diverse perspectives, fostering mutual understanding, and building a shared foundation for decision-making in co-creation projects.

Co-governance model
A co-governance model is a framework that enables shared decision-making and collaborative management among diverse stakeholders in a project or initiative. It emphasizes equal participation, transparency, and mutual accountability, allowing communities, institutions, and organizations to jointly plan, implement, and oversee activities

LKL Formalized/Formalization
The formalization of a Living Knowledge Lab refers to establishing a structured framework where stakeholders—such as researchers, communities, local authorities and practitioners—collaboratively engage in co-creation, experimentation, and knowledge exchange. This involves defining clear roles, methodologies, and processes to foster innovation and problem-solving in the specific context of the pilot, ensuring that the LKL operates as a sustainable and replicable model for learning and collaboration.

New Data Produced
New data produced refers to information, insights, or datasets generated during the course of a co-creation process, typically through activities like stakeholder engagement, participatory methods, fieldwork, surveys, or experiments. This data is often unique and context-specific, contributing to decision-making, evaluation, and the refinement of project goals.

Co-design workshop (exploratory co-design)
A co-design workshop (exploratory co-design) is a participatory session where stakeholders, including users, experts, and designers, collaborate to explore and ideate early and exploratory solutions for specific challenges of the context of the pilot. It emphasizes creativity, brainstorming, and the integration of diverse perspectives to ensure outcomes are innovative, inclusive, and aligned with user needs.
Definition of NBS innovative solutions
The definition of NBS innovative solutions involves identifying nature-based solutions (NBS) that address environmental, social, cultural, and economic challenges through sustainable and innovative approaches. The definition of such NBS should be the early outcomes of the co-design workshop activities.

Co-design workshop (executive co-design)
An executive co-design workshop focuses on refining and finalizing design solutions collaboratively with stakeholders. Unlike exploratory workshops, which brainstorm initial ideas, executive co-design delves into detailed decision-making, translating conceptual ideas into actionable designs. This phase often involves prototyping, evaluating feasibility, and aligning with technical and policy constraints. Stakeholders, including community members, designers, and experts, work together to ensure that the solutions are practical, sustainable, and aligned with project goals. The process ensures ownership and shared accountability for the resulting designs.

Participatory budgeting activities
Participatory budgeting activities involve engaging citizens in the decision-making process regarding the allocation of public funds. Through these activities, community members have the opportunity to propose, discuss, and vote on how a portion of the budget should be spent on projects or services that directly benefit their community. The process fosters transparency, inclusivity, and accountability in public finance management, empowering local populations to influence the distribution of resources and prioritize community needs.

Co-design proposals
Co-design proposals are collaboratively developed solutions or plans that emerge from co-design workshops or activities. These proposals integrate inputs from diverse stakeholders, such as community members, experts, and designers, ensuring that various perspectives and needs are considered. The goal is to create actionable, inclusive, and context-sensitive solutions. Co-design proposals typically focus on aligning objectives, refining ideas, and preparing detailed plans to be implemented effectively, fostering shared ownership and increasing the likelihood of successful outcomes.

NBS solution(s)
A description of of the NBS solution(s) decided and co-designed in the co-design process are arrived to a level of maturity which can be shared with the community and the LKL(s) to proceed into the following steps of the co-creation process (co-implementation and co-monitoring).

Validation process with stakeholders
A participatory validation process involves engaging stakeholders—such as users, community members, or other relevant parties—in the validation of a project, process, or system. This approach ensures that the validation is not only thorough but also aligned with the needs and perspectives of those who are directly impacted.

Action plan

An Action Plan in a co-creation process is a structured approach outlining the steps, timeline, and resources required to implement solutions developed through collaborative efforts. It includes clear objectives, designated roles, and specific tasks to ensure that the outcomes of co-design activities are achieved. The action plan focuses on aligning stakeholders, setting priorities, and tracking progress, ensuring that the co-created solutions are effectively realized and adapted in line with community needs, sustainability goals, and available resources.

Finalized solutions ready to be implemented
This moment refers to the stage in a co-creation process where all proposed solutions have been refined and validated through stakeholder input, co-design activities, and feasibility assessments. These solutions are detailed, practical, and aligned with agreed objectives, including technical, social, and environmental considerations. At this point, they are supported by an action plan and resources, ensuring they are ready for execution, fulfilling the goals of the participatory process while addressing the needs and challenges identified during earlier phases.

Implementation
Implementation in a Co-Creation Process involves putting co-designed and finalized solutions into action. It transforms plans into tangible outcomes through collaboration among stakeholders. This phase requires coordinating resources, assigning responsibilities, and adhering to agreed timelines while continuously monitoring progress. Flexibility is essential to adapt to unforeseen challenges or contextual changes. The implementation phase also integrates feedback loops to ensure solutions align with community needs and project goals, solidifying the participatory and inclusion.

SECTION II

3. Main Findings and Results

3.1 Text Analysis Methodology

The Implementation Plans included in this deliverable were investigated through a text analysis methodology involving a systematic examination and interpretation of the textual data to extract meaningful information. Below is a description of the key steps of this methodology:

Define Objectives: Purpose: the goal was to identify themes and measure frequency of terms.

Data Preparation: Collection: the collection of the textual data, the Implementation plan, happened in the months of October and November 2024, the eight Pilot representatives were requested to write their implementation plans. **Cleaning**: the implementation plans were cleaned of typos, and standardized in the formatting. **Organizing**: the implementation plans were subdivided into manageable units of text (e.g., paragraphs about the "moment" of the implementation plan and subparagraphs with the following questions: description of the step; Issues, Challenges, roadblocks; Results, outputs, outcomes (expected or achieved); Risk mitigation; Stakeholders involved or to be involved in this step; Additional comments; Timeline (expected or achieved).

Analysis Techniques: Quantitative Analysis: Frequency Analysis: Measure word or phrase occurrences. **Qualitative Analysis**: Thematic Coding: Identify and categorize recurring themes. Narrative Analysis: Explore how stories or arguments are structured.

Tools and Software: Manual: Conducted using spreadsheets and word processors.

Interpret Findings: Synthesize Results: Combine insights from different techniques. **Contextualize**: Relate findings to the research question or objectives (finding recurring themes and red threads among the implementation plans).

Reporting: Present the results through visualizations (charts, tables) and written summaries.

The text analysis focused on the following aspects:

- Framing the context (co-diagnostic and ideation);
- Participatory budgeting process;
- Identification of the most appropriate NBS / NBS supporting tools;
- Codesign of NBS as a product and as a process (material and immaterial);
- Territorial impact of the NBS (urban, coastal, rural, forest).

3.2 Flexibility and Adaptability in the Implementation Plans

The table below shows if and how the different pilots have addressed and interpreted the different "moments" requested in the implementation plan, providing a visual representation of how they have tailored them according to what they were able to foresee and plan in this specific moment (November 2024) of the co-creation process.

	Brussels	Strovolos	Estarreja	Barcelos	Rome	Roskilde	Azores	Cacères
Co-define Goals and Challenges	P R V	P S R	P R V	P R	S V	P S	P V	P R
List of NBS solutions	R S	S R V	R	R S	R	N/A	R P	R S
Co-diagnostic	P S	Community P V R Authority P V	P	P V S R	V R	P	P S	P
Co-governance model	P	V R S P	R P	N/A	P V R	P V	R	P
Formalized LKL	P	P V	P R	P	P	P	P R	P
New data produced	S V	(learning from the past) R Local Perspectives S (data gathering-citizen Science) P R S	S	R V S	S	S	S	S
Co-design exploratory workshop	P	P S V Co-creation workshop P	V P R	P	P S	N/A	R	P
Definition of NBS solutions	N/A	N/A	N/A	N/A	S	N/A	R P	N/A
Co-design executive workshop	N/A	V S	N/A	N/A	P S	N/A	N/A	V
Participatory budgeting	N/A	P S V	N/A	P	S R V	N/A	P R	N/A

Co-design proposals	N/A	🔀 S	P S	P	S	P	R	R
NBS solutions	N/A	N/A	S	N/A	S	N/A	N/A	R
Validation process	N/A	🔀 V P	P V	P	V P	N/A	P	N/A
Action plan	N/A	🔀 S	N/A	N/A	S	N/A	N/A	V
Finalized solutions	N/A	N/A	N/A	P	S	N/A	N/A	V
Implementation	N/A	P	P	N/A	P	N/A	N/A	N/A

Table 1: RSPV Analysis of the eight Implementation plans (Author: D. Ottaviani, B. Di Donato)

Legend:

- Resources (R) represents the collection of available elements, i.e. the initial conditions or resources, understood as both material facts and immaterial values.
- Score (S) is the transcription of the process, a set of graphic notations necessary to invent, organise and communicate an action.
- Valuaction (V) stands for critical evaluation. The term is a combination of value and action, emphasising the active aspect of this phase. Different alternatives are evaluated and comments and observations are encouraged.
- Performance (P) is the way in which the intentions of the project are realised.
- If two or more boxes are coloured in the same tone, it means that those moments have been connected or merged together
- Some boxes have been subdivided to show additional moments integrated in a pilot process
- N/A= not available yet
- 🔀 "moments" were inverted

A central insight across all plans is the need for flexibility in the co-creation process. Engaging diverse stakeholders, particularly under evolving social, environmental, and institutional conditions, requires adaptive frameworks and it proved very hard for the pilots to foresee many of the different "moments" in the future. The more distant and further away a moment results in the planning the harder it has been for the pilot to actually define the contents and activities to be included in such moments. This difficulty is related to the impossibility for Pilots to imagine all the different outcomes of each "moment", given the multiplicity of stakeholders involved, their different agendas, and the multiple issues that can affect each "moment". Moreover, each pilot is in a slightly different stage of the process, it therefore seems relevant to include the maximum degree of flexibility in the planning of the activities of co-creation and especially of co-design. This flexibility allows for tailored responses to local priorities while maintaining alignment with overarching goals, ensuring dynamic participation and ownership from all parties involved. The flexibility and adaptability of the implementation plans is highlighted by how each different pilot has interpreted the different "moments" in the implementation plan and how they have possibly merged some moments together or added additional moments relevant for their planning (see Table X.X). What seems interesting, is the iteration that characterized the process that each pilot creates, in a non-rigid, agile and flexible way, varying and giving different values to the sequence of moments of Performance, moments of Valuaction, moments of Scoring, and moments of Resourcing (see Table 1).

Additionally, it is worth noting that other different interpretations in some aspects of the process are spread across the pilots: for instance, the way LKL are being interpreted varies greatly among the pilots, some intending a moment of focused work with external experts (e.g. Lagoa), others

having multiple, parallel LKLs (Estarreja), others intending the LKL as an expansion and active application of their co-governance bodies (Rome, Roskilde).
Another element worth noticing is the flexibility in the inclusion of the stakeholders in the different moments, every pilot selects what stakeholders include in each activity according to the outcome desired, the likeability to prevent conflict of interests, the capacity of mediation that the co-governance body allows.

3.3 Tools and Methods

The analysis of the Implementation plans revealed the usage by the pilots of 38 different tools and methods in the various steps of the co-creation process. Below is a table of the tools and methods adopted by the pilots supported with the number of times these were used by each pilot. A pie-chart further below illustrates the recurrences and percentage of usage of the various tools and methods across the TRANS-Lighthouses project (as planned by the 8 pilots in November 2024). For an in-depth description of the features of the different methods and tools please refer to the D5.3 and D6.8.

Category	Tools&Methods discussed in the implementation plans	Estarreja	Rome	Barcelos	Lagoa	Cacères	Roskilde	Strovolos	Brussels	Total	Total by category
Facilitation and Group Dynamics	Open discussion among stakeholders/meetings (group meetings, one-to-one meetings etc)	1	1		2	3	3	3	1	14	14
Capacity Building and Training	Seminar/training sessions/Advisory activities			3	1	2	1			7	16
	Social events (i.e.European Night of Researchers, Cinema Nights, barbeque, Door-to-door-campaing, etc)				2			1	3	6	
	Awareness-raising workshop/unlearning activities			2					1	3	
Surveys and Questionnaires	Survey/questionairre				1		1	3	1	6	12
	Interviews (structured, semi, non-structured)			1				3	2	6	
Digital Tools and Platforms	Communication Tools (i.e Whatsapp, emails, Microsoft Teams)							1		1	19
	Actionbound (online free application)							1		1	
	Co-creation platforms (i.e. X-curve Framework)							1		1	
	Microsoft Office applications		1					2		3	
	Autocad/3d tools		1					2		3	
	Virtual Knowledge exchange network/website (ie.e Miro)				1		1	1		3	
	GIS software	2						4	1	7	
Visualization and Mapping	Mental Mapping /Urban Sketch		1		1					2	10
	Community/collaborative mapping	4	1		1		1		1	8	
Collaborative Decision-Making	Focus groups	4	1					1		6	15
	Collaborative work	2						1		3	
	Design Thinking	2						1		3	
	Expert workshop				1	1				2	
	World Cafè	1								1	
Monitoring and Evaluation (M&E)	Future Creation Workshop						1			1	4
	Monitoring and evaluation dashboard							1		1	
	Eco Counters (evaluation on pedestrian use of path)				1					1	
	ABCD (Asset Based Community Development) Methodology				1					1	
	Artistic micro-residency				1					1	2

Creative and Artistic Methods	Artistic methodology (Art Povera, Land Art, Recycling art, Bioart)				1					1	
Storytelling and Narrative Approaches	Storytelling/Visual Stories tools							2		2	4
	digital materials (photo/videos)							1		1	
	Visual audio recording							1		1	
Gamification and Simulation	CoPaB - Digital Serious Geogame	2	1					1		4	12
	NBS cards	2	1	1				1		5	
	Participatory bugdeting tool			1				1		2	
	Viz tools and dynamic maps simulating scenarios							1		1	
Participatory Action Research (PAR)	Menu MATER Tool					1				1	13
	Architectural workshop		1							1	
	Design/Construction tools and Materials							1		1	
	Desk Research	1	1					1		3	
	Walkthrough	2	2		1				2	7	

Table 2: Table listing the methods and tools included in the Implementation Plans divided by categories and their recurrences among pilots (Author: D. Ottaviani)

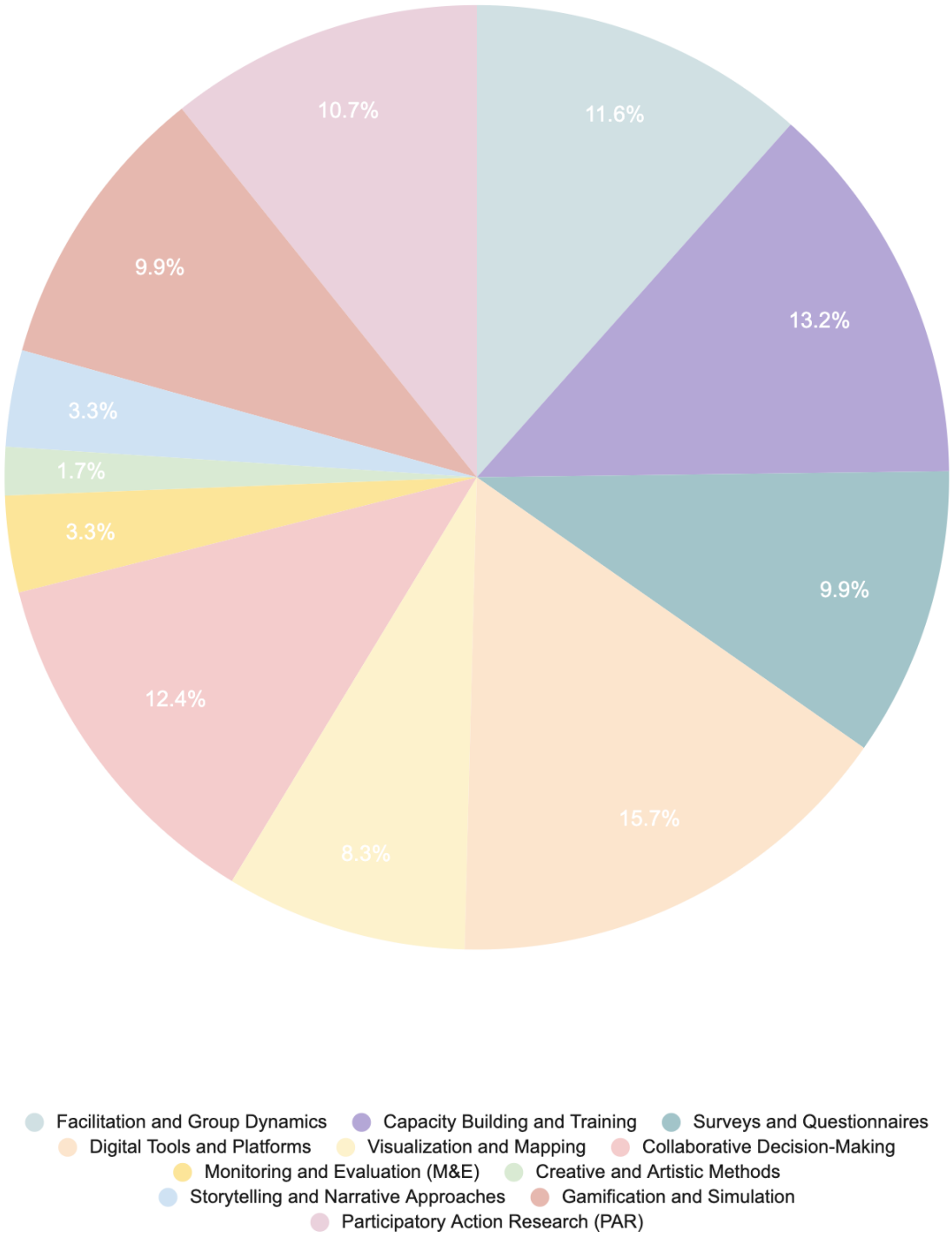

Figure 1: Pie Chart showing the percentage of usage of Methods and Tools, divided into categories, in the eight Implementation Plans (author: D. Ottaviani)

The pie chart (Figure 1) illustrates the distribution of various categories of tools and methodologies used in participatory processes, as represented by their respective percentages. The categories represented and highlighted by the descriptions in the implementation plans are the following:

- **Facilitation and Group Dynamics**: Techniques to guide discussions, encourage participation, and foster collaboration. Examples: Workshops, Focus Groups, Brainstorming, World Café, Open Space Technology.
- **Visualization and Mapping**: Tools and methods that help participants organize thoughts, analyze spatial data, and represent complex ideas visually. Examples: Mind Mapping, Participatory Mapping, Journey Mapping, Vision Boards.
- **Surveys and Questionnaires**: Methods for collecting structured feedback from participants to inform decision-making. Examples: Online Surveys (Google Forms, SurveyMonkey), Paper-Based Surveys, Interviews.
- **Collaborative Decision-Making**: Approaches that ensure inclusive and transparent decision-making processes. Examples: Consensus Building, Multi-Criteria Decision Analysis (MCDA), Voting Systems (Ranked-Choice, Dot Voting).
- **Participatory Action Research** (PAR): A research approach involving stakeholders in problem identification, data collection, and solution co-creation. Examples: Community-Led Data Collection, Problem Tree Analysis, Solution Co-Creation.
- **Storytelling and Narrative Approaches**: Using personal and collective stories to share experiences, reflect on issues, and shape solutions. Examples: Digital Storytelling, Case Studies, Role-Playing.
- **Creative and Artistic Methods**: Engaging participants through artistic expression to facilitate dialogue and action. Examples: Participatory Theatre, Community Murals, Photography (Photovoice).
- **Digital Tools and Platforms**: Online technologies that enhance collaboration, engagement, and participatory decision-making. Examples: Collaborative Platforms (Miro, MURAL, Trello), Social Media Campaigns, Crowdsourcing (IdeaScale).
- **Gamification and Simulation**: Applying game design elements to encourage participation and learning. Examples: Serious Games, Scenario Planning, Interactive Workshops.
- **Conflict Resolution and Mediation**: Structured methods to address disputes, build trust, and promote dialogue. Examples: Dialogue Circles, Mediation Techniques, Peacebuilding Workshops.
- **Monitoring and Evaluation** (M&E): Methods for assessing the impact and effectiveness of participatory initiatives. Examples: Outcome Mapping, Participatory Rural Appraisal (PRA), Feedback Mechanisms.
- **Capacity Building and Training**: Strengthening skills and knowledge for meaningful participation in decision-making. Examples: Skills Development Workshops, Mentorship Programs, Toolkits and Guides.

The pie chart in Figure 1. illustrates the distribution of participatory tools and methods used in the implementation plans of eight pilot cases within the TRANS-Lighthouses project. It reveals a diverse approach to stakeholder engagement, emphasizing visual communication, capacity building, and collaborative decision-making.

Among the various methods, Visualization and Mapping emerges as the most frequently employed (15.7%), highlighting the importance of spatial representation in participatory processes. Close behind, Capacity Building and Training (13.2%) plays a crucial role in equipping participants with the skills and knowledge needed for meaningful involvement. Facilitation and Group Dynamics (11.6%) also stands out, reflecting the value of guided discussions in fostering collaboration.

Other significant approaches include Participatory Action Research (10.7%), which actively involves stakeholders in research and problem-solving, as well as Collaborative Decision-Making (9.9%), ensuring inclusive and transparent processes. Additionally, Storytelling and Narrative Approaches (9.9%) demonstrate the power of personal experiences in shaping community-driven solutions.

Though used less frequently, Digital Tools and Platforms (8.3%) still play a notable role in enabling remote participation and engagement. Meanwhile, Gamification and Simulation (3.3%) and Monitoring and Evaluation (M&E) (3.3%) contribute to fostering interactive learning and assessing project outcomes. On the lower end, Surveys and Questionnaires (1.7%) and Creative and Artistic

Methods (1.7%) see minimal application, suggesting that other participatory strategies were more suited to the needs of the pilot cases.
Overall, the chart reflects a balanced and strategic use of participatory methods, where visual tools, training, and facilitation take center stage in shaping the TRANS-Lighthouses project's implementation. By combining structured decision-making with creative and interactive approaches, the initiative fosters inclusive and effective community participation.
It is worth noticing that some of the tools and the methods used by the Pilots seem to be more or less explicitly related with different aspects of "unlearning" that is included as a pivotal concept and methodology in the TRANS-Lighthouses project and addressed in T2.4 and D2.3. Unlearning in the context of Nature-Based Solutions (NBS) refers to the process of intentionally challenging and discarding outdated, ingrained beliefs, practices, or assumptions that hinder the adoption of innovative, sustainable approaches. It involves creating space for new knowledge, perspectives, and behaviors that align with ecological principles and collaborative processes. For NBS, unlearning may include shifting away from conventional infrastructure solutions, embracing participatory decision-making, and fostering a deeper connection to natural systems as part of urban and rural development strategies. In the case of the TRANS-Lighthouses project the Pilot de Caceres / Extremadura has experimented the methodology in depth, while other pilots have initiated unlearning related activities. For example, some pilots have engaged in training sessions directed to teachers and students to unlearn about NBS (like in Barcelos) or myths debunking sessions (Brussels Pilot).

3.4 Issues, Challenges and Roadblocks

The eight implementation plans presented a list of 39 issues (the request asked for Issues, Challenges and Roadblocks to include the different nuances of the concept) that arose or are possibly foreseen in the development of their pilot cases. The different issues have been grouped according to different categories that could explain the main features of the concerns. These categories are:

- Stakeholder Engagement: this category might include lack of inclusivity such as exclusion of marginalized groups or those with differing viewpoints. Stakeholder fatigue: overburdening participants with prolonged or unclear processes. Power imbalances: Dominance of influential stakeholders undermining equitable contributions.
- Process Design: this category includes many different aspects related to the process of design stretching from "ambiguity in roles": Unclear roles and responsibilities among participants to "rigid frameworks" like the inability to adapt plans to evolving needs or unexpected challenges or "time constraints" such Insufficient time allocated for meaningful collaboration.
- Communication, within communication it has included "misaligned expectations": differing priorities and visions among stakeholders. "Language barriers": Complex or inaccessible language alienating participants. "Ineffective feedback loops": Lack of mechanisms for incorporating input into decision-making.
- Resources: issues such "financial limitations": Insufficient funding to support activities and tools. "Access to data": Challenges in obtaining or sharing relevant information and "capacity gaps" namely, limited skills or knowledge among stakeholders.
- Governance: "conflicts of interest" like competing priorities among stakeholders or institutions; policy misalignment: Tension between co-creation goals and existing regulatory frameworks. "Fragmented decision-making": Poor coordination across sectors or levels of governance.
- Evaluation and Assessment: this category mostly related to unclear impact evaluation, namely the absence of robust systems to measure outcomes and adapt strategies.
- Physical/Contextual Constraints: the presence of elements in the context that result hindering or slowing the process for their necessity of being addressed under specific regulatory or technical aspects
- Bias: prejudices against collaborative process, unawareness of NBS, lack of interests in

nature and human-nature relation.

The table below shows the issues presented by the pilots in their implementation (as challenges already addressed or foreseen in the course of the implementation of the project), groups by categories and presents the recurrence of some issues among the pilots.

The following pie chart diagram presents what are the categories that impact the most the Implementation Plans.

		Estarreja	Rome	Barcelos	Lagoa	Cacères	Roskilde	Strovolos	Brussels	Total
Stakeholder Engagement	Excessive number/diversity of stakeholders engaged				1			1	1	2
	Risk of losing more silent voices (in group works)							1		1
	Resistance/prejudice/ mistrust regards participative process/Lack of participation/lack of participatory culture/lack of maturity in local entities regarding participation/lack of trust in participation (i.e. long timing engagement)	2		1		2		1	2	8
	difficulties in Involvement marginalised groups							1		1
	Precarious and semi-informal structure of associations						1			1
	Voluntary participation to associations						1			1
	Achieving strong commitment						1			1
	Involvement of different levels and age of students			1						1
	Turnover in stakeholders (new scholastic year/elections of elective representatives etc)	2								2
	Management of expectations in stakeholders	1								1
	Complicate consensus building		1							1
Communication	Digital and technological gaps							1		1
	Communication and information exchanges complexities							1		1

	Sharing knowledge and and information between different LKL/different stakeholders	1	1							2
Governance	Overlapping of several governmental departments /							1		1
	Diverging prioritises/expectations /conflict of interests	1			1			1	2	5
	Difficulties in conciliating agendas/workloads/timing/procedures of different stakeholders	1	3		1	1				6
	Integration of participatory process within local regulations			1						1
	Disruptive/innovative nature of NBS compared to conservative local/national regulations			1						1
	Definition of who can vote on budgetary issues			1						1
	Slowness in the implementation of Laws					1				1
	Inertia of the centralised system					1				1
	Vested interests in conventional solutions					1				1
	Habit of implementing top-down decisions for highly technical issues or issues that citizens do not perceive as relevant/directly involving them					1				1
	GDPR issues/Bureaucratic issues	1								1
Evaluation and Assessment	Difficult in evaluating/measuring impact of participatory co-governance							1		1
Process Design	Limitation of creativity through readymade NBS solutions							1		1
	Time consuming process	2			1	1			1	5
	adverse climate conditions to perform activities				1					1

	Respecting Timelines			1						1
	Too broad focus and objectives/territory too large and diverse	2								2
	Variable timing in construction sites		1							1
Bias	Lack of interest/awareness in nature conservation topics	1							1	2
	Perception of possible risks			1						1
	Difficulties in promoting the transmission of ancestral knowledge			1						1
	Myths associated with NBS								1	1
Resources	Securing resources/fundings/Covering maintenance costs			1		1				2
	Allocating budget for NBS		1							1
Physical/Contextual Constraints	Archeological presence (Superintendency regulating the interventions in the public areas)		1							1
	Ecological/physical constraints (Poor infiltration soils, high urbanizations/limit for space, not direct access to water for irrigation etc)		1						1	2

Table 3: Table listing the different Issues, Challenges and Roadblocks mentioned in the Implementations plans, categorised, and with recurrences in different pilots. (Author: D. Ottaviani)

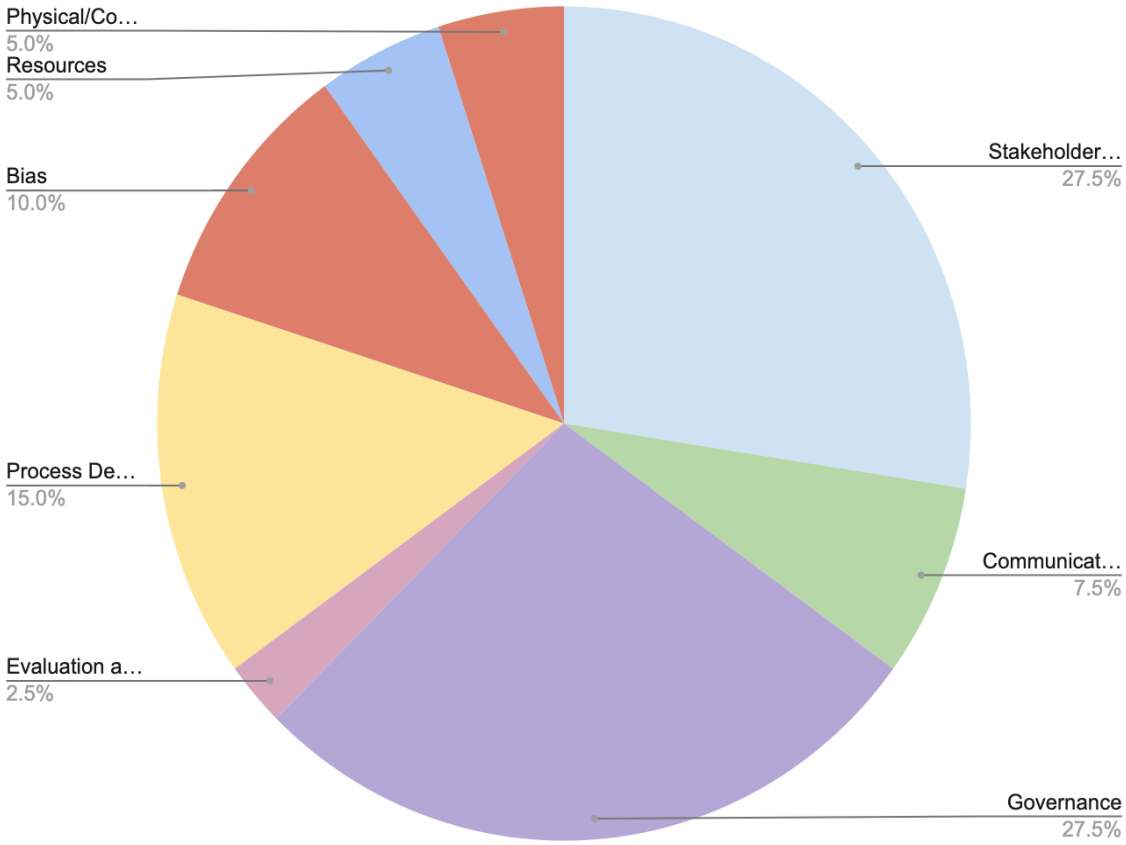

Figure 2: Pie Chart showing the share of impact of the different categories of Issues in the Implementation Plans. (author: D. Ottaviani)

Despite their unique settings, the pilot cases reveal a shared set of challenges. The pie chart (Figure 2) outlines various categories of issues, roadblocks, and challenges and how they weigh in the co-creation process, according to the eight pilots:

1. **Stakeholder engagement (27.5%)** - Represents difficulties in involving and maintaining active participation from stakeholders. Among the challenges are recurrent: Excessive number/diversity of stakeholders engaged; Resistance/prejudice/mistrust regards participative process/Lack of participation/lack of participatory culture/lack of maturity in local entities regarding participation/lack of trust in participation (i.e. long timing engagement); Turnover in stakeholders (new scholastic year/elections of elective representatives etc)
2. **Governance (27.5%)** - Highlights issues with decision-making, responsibility distribution, and policy alignment. Specifically, numerous times have been listed: Diverging prioritises/expectations/conflict of interests; Difficulties in conciliating agendas/workloads/timing/procedures of different stakeholders
3. **Process design (15%)** - Refers to challenges in structuring the co-creation workflow. The highest source of concerns is related to: Time consuming process and that there might be too broad focus and objectives/territory too large and diverse.
4. **Bias (10%)** - Concerns about subjective perspectives influencing outcomes. Among the biases, it spikes the lack of interest/awareness in nature conservation topics.
5. **Communication (7.5%)** - Barriers in clear and consistent information sharing. "Sharing knowledge and information between different LKL/different stakeholders" worries more than one pilot.

6. **Physical/Contextual constraints (5%)** - Practical limitations like funding or site conditions. Obviously, these constraints are related to the specific contexts of the pilots, nevertheless, they can be divided into ecological constraints: (Poor infiltration soils, high urbanizations/limit for space, not direct access to water for irrigation etc) and Heritage (Archeological presence)
7. **Resources (5%)**. Two are the main concerns in this area: Securing resources/fundings/Covering maintenance costs and Allocating budget for NBS
8. **Evaluation and assessment (2.5%)** - Challenges in measuring effectiveness and outcomes. One pilot referred "Difficult in evaluating/measuring impact of participatory co-governance" as a concern related to the possibility of replicating the model.

3.5 Risk Mitigation

Within the Implementation Plans the Pilots highlighted a set of 41 different risk mitigation techniques/strategies that they are currently applying or are planning to put in place when the issues arise. Below, in the table, it is listed a set of 8 categories, that are deeply related to the categories in the Issues, Challenges and Roadblocks paragraph, into which these techniques fall into.

- Strategic alignment: the objective is to ensure that all stakeholders have shared goals and clear roles.
- Operational management which aims at managing the execution of co-creation processes effectively.
- Communication and collaboration that allows to foster open and effective communication among participants.
- Legal and ethical safeguards: aiming at aligning the process and the goals of the project to existing legal and ethical frameworks
- Risk assessment and monitoring allows to continuously identify and manage potential risks.
- Cultural and relational management to build trust and manage cultural differences among participants.
- Technological safeguards to mitigate risks associated with the technology used in co-creation.
- Performance evaluation and adaptation aiming at ensuring the project meets its goals and adapt as necessary.

		Estarreja	Rome	Barcelos	Lagoa	Cacères	Roskilde	Strovolos	Brussels	Total
Operational Management	Flexibility in scheduling activities				1					1
	Flexibility and adaptability into governance framework							1		1
	Involve project managers to mitigate any delays							1		1
	Involve some stakeholders only in some activities to avoid conflict of interests	1								1

	Start/break down project into smaller bits or priority demands to build engagement/Implement quick-wins activities and practical activities		1						1	2
	Involve Municipal departments early								1	1
	Adjust activities for specific audiences		1							1
	Parallel consultations/activities with different stakeholders to shorten the timing		1							1
	transcript only relative information and themes							1		1
Technological Safeguards	ICT experts to manage technological issues in online activities				1					1
	Engagement of technical consultants/experts to ensure legal/technical/budgetary feasibility	1	1	1				1	1	5
Strategic Alignment	Narrow the intervention area							1		1
	try to identify goals that interest diverse government departments to get more interest							1		1
	Define clear roles and responsibilities (and document these expectations)							1		1
	Engage diverse stakeholders early to align interests and enhance collaboration								1	1
Risk Assessment and Monitoring	Try to foresee possible							1		1

	objections in advance									
	Maintaining on-demand advice service/support to Municipalities					1				1
	Try to implement the solutions before election to avoid halts	1								1
Communication and Collaboration	Implement methodologies to allow equal representation of diverse voices							1		1
	establish structured communication channels/ pay attention to communication	1						1		2
	Training to improve stakeholders' governance skills							1		1
	Provide complementary tools to address all participants abilities(analogue, digital, textual, verbal, visual means of communications)							1		1
	Prepare meeting discussions to be on point and direct							1		1
	Prepare the invitation campaign on time							1		1
	ensure that presentation communicates the process that led to a proposal							1		1
	Use local dialect/language for better communication							1		1
	Express questions in informal ways							1		1

	Engage the community in sharing/disseminating activities (word of mouth/social media etc)							1		1
	Raise awareness on NBS and climate change/risks and benefits of relation with nature among stakeholders			1					1	2
	Define/adjust communication for different stakeholders	2								2
	Engage citizens/stakeholders that have already implemented similar solutions for debunking sessions								1	1
	door-to-door campaigns to increase participation								1	1
Performance Evaluation and Adaptation	Establish regular feedback loops							1		1
	Aims/goals in continuous re-negotiation and adaptation						1			1
	Keep plans flexible		1	1						2
Cultural and Relational Management	contingency plans tp address participation fatigue and stakeholders turnover							1		1
	Try to ensure age diversity							1		1
	Building trust with participants							1		1
	Create financial incentives for participation							1		1

	Moderate discussion to ensure just and fair procedures/decision making							1		1
	Validation of solutions must be transparent and impartial to avoid mistrust	1								1
Legal and Ethical Safeguards	If possible align pilot goals with existing city planning priorities (e.g. Municipal plans, Climate plans etc)								1	1

Table 4: Table showing the Risk Mitigation techniques included in the Implementation Plans, grouped by categories. (Author: D. Ottaviani)

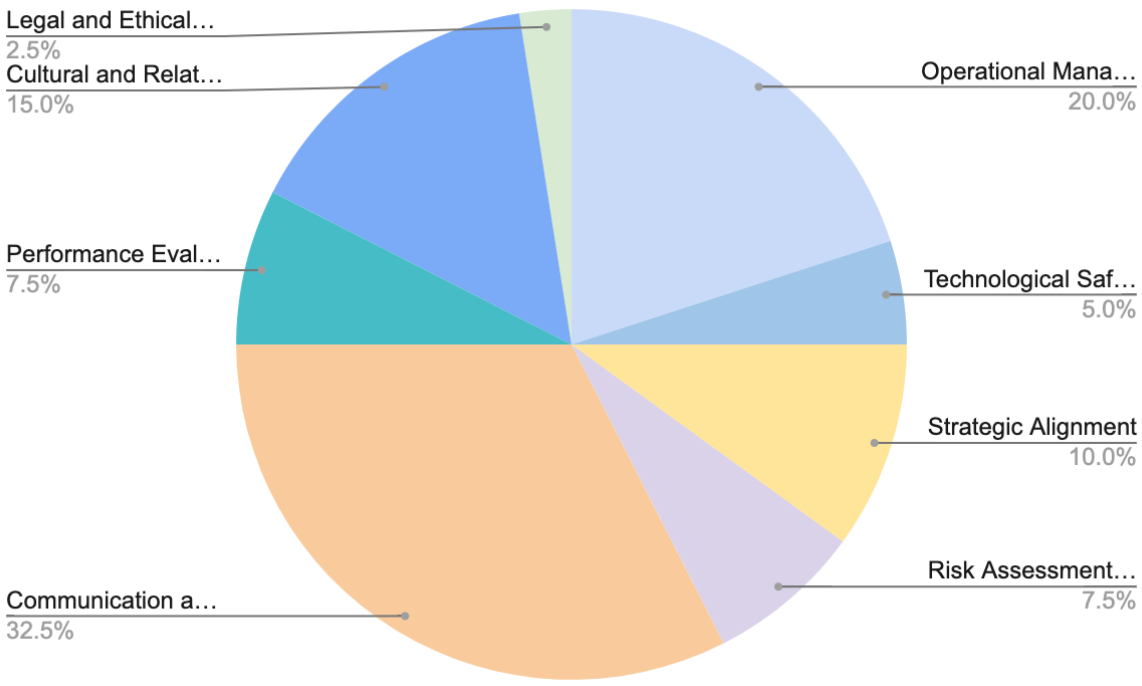

Figure 3: Pie Chart showing the share of impact of the different categories of Risk Mitigation techniques in the Implementation Plans. (Author: D. Ottaviani)

The pie chart (Figure 3) illustrates the distribution of focus among various risk mitigation techniques in co-creation processes, expressed as percentages of overall emphasis In the following way:

- Communication and collaboration: 32.5%. The largest portion, emphasizing the importance of effective communication in co-creation to address risks and ensure seamless teamwork.
- Operational management: 20.0%. A significant area, reflecting the need for robust planning and execution of operational tasks.
- Cultural and relational management: 15.0% This section highlights the role of trust-building and managing cultural differences in collaborative environments.
- Strategic alignment: 10.0%. It is pivotal to ensure that all the stakeholders are aligned on objectives, reducing misaligned goals and conflicts.
- Risk assessment and monitoring: 7.5% Underlines the need for continuous risk identification and monitoring.

- Performance evaluation and adaptation: 7.5% Emphasizes evaluating outcomes and adapting processes for future improvements.
- Technological safeguards: 5.0% A smaller focus, yet critical for addressing technological risks.
- Legal and ethical safeguards: 2.5% The smallest segment, focused on protecting intellectual property and adhering to ethical standards.

The chart suggests a strong emphasis on communication and operational management, underscoring their critical roles in mitigating risks in co-creation processes.

4. Recommendations and final remarks

4.1 Recommendations for co-creating Nature-Based Solutions (NBS) through participatory processes with vulnerable population in rural, urban, coastal, and forestry areas

Based on the analysis of the implementation plans of the eight pilots in the TRL project, the following recommendations have been formulated. These recommendations are intended to guide the pilots during the implementation (T5.3) of their Nature-Based Solutions (NBS) in their respective areas through a participatory approach involving vulnerable populations.

Emphasize flexibility in planning co-creation processes

- Adaptability is essential: Design flexible co-creation processes to accommodate uncertainties from diverse stakeholder needs and evolving external conditions. Tailor activities to local priorities while maintaining alignment with overarching goals.
- Plan for unpredictability: Acknowledge the challenges in forecasting specific "moments" of the process due to the diverse outcomes inherent in multi-stakeholder engagements.
- Adopt a dynamic approach: Use an iterative and adaptive framework that allows for merging, modifying, or adding stages to the process based on emerging insights and needs.

Use diverse tools and methods

- Leverage varied methodologies: Incorporate tools such as open discussions, collaborative mapping, and walkthroughs to address the multifaceted nature of co-creation and co-design. Employ specialized tools like "Future Creation Workshops" or the "Menu Mater Composta" as needed for specific pilot contexts.
- Evolve practices: Recognize that methodologies may evolve, with some tools becoming obsolete while others emerge, reflecting the dynamic nature of participatory processes.

Address recurring challenges

- Stakeholder engagement and governance: Prioritize inclusive stakeholder involvement and align diverse priorities, agendas, and decision-making processes.
- Streamline process design: Mitigate challenges arising from time-intensive workflows, overly broad objectives, or diverse territorial demands by focusing on clear, achievable goals.
- Overcome bias and communication barriers: Address subjective perspectives and improve knowledge-sharing mechanisms to enhance the effectiveness of co-creation efforts.
- Navigate physical and resource constraints: Develop strategies to manage limited funding, ecological challenges, and maintenance costs, tailored to the specific vulnerabilities of each context.
- Foster "Unlearning": Encourage stakeholders to challenge assumptions and relearn new approaches as part of the co-design process, fostering a more open and innovative environment.

Implement Risk Mitigation Strategies

- Strengthen communication and collaboration: Prioritize seamless information-sharing and teamwork among all participants.
- Focus on operational and cultural management: Enhance operational efficiency and trust-building while managing cultural dynamics effectively.
- Adopt holistic safeguards: Include technological, legal, and ethical safeguards to ensure comprehensive risk management.
- Monitor continuously: Use iterative risk assessments and performance evaluations to adjust strategies as needed.

Incorporate General Best Practices

- Iterative and adaptive frameworks: Design both planning and implementation stages to be iterative, allowing for continuous adjustments based on stakeholder input and evolving conditions.
- Build collaboration and trust: Foster open communication and trust-building activities to address challenges effectively and create strong partnerships.
- Ensure contextual sensitivity: Customize tools, methodologies, and strategies to address the unique ecological, social, and economic contexts of each pilot area.

By adopting these recommendations, pilots can effectively implement Nature-Based Solutions (NBS) through participatory processes that place vulnerable populations at the center of decision-making. This approach not only empowers communities by valuing their knowledge and experiences but also fosters a sense of ownership and responsibility for the solutions developed. The integration of diverse perspectives ensures that the interventions are more inclusive, equitable, and tailored to the unique challenges faced by rural, urban, coastal, and forestry areas. Moreover, the emphasis on collaboration and trust-building enhances social cohesion, creating stronger networks of support within and between communities. By involving stakeholders throughout the process, pilots can address immediate vulnerabilities while simultaneously building long-term resilience to environmental, social, and economic challenges. Flexibility and adaptability in planning and implementation further allow for iterative improvements, ensuring that solutions remain relevant as conditions evolve. This dynamic approach not only mitigates risks and overcomes unforeseen challenges but also opens opportunities for innovation, learning, and capacity-building within local populations. Finally, the participatory process strengthens the sustainability of outcomes by embedding them within local governance structures and aligning them with community priorities. This ensures that the solutions are not only effective in the short term but also maintain their impact over time, contributing to the resilience of both ecosystems and the people who depend on them. Through these efforts, NBS pilots can serve as exemplary models for inclusive and effective climate adaptation and environmental management strategies across diverse and complex landscapes.

Lessons learnt:

It is important to recognize that several of the challenges and issues identified by the pilot projects already correspond to the risk mitigation strategies that have been implemented. This alignment underscores a proactive approach to addressing potential obstacles within the project framework. The table below highlights these connections, providing an opportunity for further reflection and knowledge exchange among pilot initiatives that may be encountering similar circumstances. By examining these linkages, pilots can gain insights into effective mitigation strategies and adapt them to their specific contexts, fostering a more resilient and responsive implementation process.

Issues	**Mitigation strategies**
Process design (15%) - Refers to challenges in structuring the co-creation workflow. The highest source of concerns is related to: Time	Operational management: 20.0%. A significant area, reflecting the need for robust planning and execution of operational tasks.

consuming process and that there might be too broad focus and objectives/territory too large and diverse.	Strategic alignment: 10.0%. It is pivotal to ensure that all the stakeholders are aligned on objectives, reducing misaligned goals and conflicts.
Bias (10%) - Concerns about subjective perspectives influencing outcomes. Among the biases, it spikes the lack of interest/awareness in nature conservation topics.	Cultural and relational management: 15.0% This section highlights the role of trust-building and managing cultural differences in collaborative environments.
Communication (7.5%) - Barriers in clear and consistent information sharing. "Sharing knowledge and information between different LKL/different stakeholders" worries more than one pilot.	Communication and collaboration: 32.5%. The largest portion, emphasizing the importance of effective communication in co-creation to address risks and ensure seamless teamwork
Evaluation and assessment (2.5%) - Challenges in measuring effectiveness and outcomes. One pilot referred "Difficult in evaluating/measuring impact of participatory co-governance" as a concern related to the possibility of replicating the model.	Risk assessment and monitoring: 7.5% Underlines the need for continuous risk identification and monitoring. Performance evaluation and adaptation: 7.5% Emphasizes evaluating outcomes and adapting processes for future improvements.

4.2 Final remarks

Final remarks for Brussels Pilot

The Brussels pilot is facing a series of challenges that reflect the complexity of implementing Nature-Based Solutions (NBS) in a highly urbanized and diverse context. The excessive number and diversity of stakeholders engaged poses significant coordination challenges. While involving various groups is essential for ensuring inclusivity, it also leads to diverging priorities, expectations, and conflicts of interest that make consensus-building more difficult. Additionally, the resistance, prejudice, and mistrust regarding participatory processes creates significant barriers. Many stakeholders, especially those from local entities with limited experience in participatory governance, are skeptical of long-term engagement, making it harder to build the necessary trust for meaningful collaboration. Furthermore, the project faces challenges in overcoming a general lack of interest and awareness in nature conservation topics such as the prevention from flooding and the management of storm rain water, which compounded the difficulty of engaging participants in NBS initiatives. Myths surrounding the concept of NBS, along with the ecological and physical constraints of the urban landscape (such as poor soil infiltration, limited green space, and high urbanization), also hinder the project's progress. These constraints highlight the need for creative, adaptive solutions that could work within the limitations of the environment. Despite these challenges, Brussels pilot employed several key risk mitigation strategies that allowed it to navigate these complexities and foster more effective collaboration. A critical strategy is breaking the project into smaller, manageable phases or priority demands. This approach allows for the implementation of quick wins and practical activities, building momentum and demonstrating tangible outcomes early in the process, which helps engage stakeholders more effectively. Engaging relevant municipal departments early in the process is another important strategy. By involving these departments from the outset, the pilot ensured that the project aligns with municipal priorities and received the necessary support from the local government. Similarly, engaging technical consultants and experts early on ensures that the proposed NBS were legally, technically, and financially feasible, which helps address concerns around feasibility and sustainability. The pilot also focuses heavily on raising awareness about NBS and climate change, emphasizing the risks and benefits of a closer relationship with nature. To overcome resistance and skepticism, the team organized "myth debunking" sessions featuring citizens and stakeholders who had already implemented similar solutions, showing the practicality and effectiveness of NBS.

Additionally, door-to-door campaigns were launched to increase participation, helping to break down barriers to engagement and encourage wider involvement from the community. Aligning the pilot's goals with existing municipal priorities, such as climate action plans or other urban development frameworks, also is proving its effectiveness. By aligning with these pre-established goals, the project gains broader institutional support and helps ensure that NBS are viewed as complementary to ongoing city planning efforts. Ultimately, Brussels pilot demonstrates the importance of early stakeholder engagement, flexibility, and clear communication in overcoming the challenges of implementing NBS in an urban setting. By breaking the project into manageable components, aligning with city priorities (such as the Municipality Water Plan), and building trust through awareness-raising and direct engagement, the pilot is trying to address both the physical and social challenges it faces. The lessons that will be learned from this experience can serve as a valuable guide for future participatory NBS initiatives in similarly complex urban environments, showing that, with careful planning and strategic engagement, it is possible to overcome barriers and create sustainable, nature-based solutions.

Final remarks for Strovolos Pilot

The Strovolos pilot is facing a number of challenges that are common in participatory processes, particularly in contexts involving diverse and sometimes conflicting stakeholders. One of the primary hurdles was the sheer number and diversity of participants, which, while offering a rich variety of perspectives, also created complexities in ensuring that all voices were equally heard. The risk of losing silent or marginalized voices in group settings highlights the need for structured methods to ensure inclusive participation, especially for vulnerable or underrepresented categories. The project is also facing resistance, prejudice, and mistrust regarding participative processes, exacerbated by a lack of participatory culture and maturity within local entities. These barriers contribute to difficulties in maintaining long-term engagement, as well as in fostering trust among stakeholders. Additionally, the project struggles with the complexities of communication and information exchange, especially when overlapping government departments have divergent priorities and expectations. Digital and technological gaps further compound these issues, requiring thoughtful strategies to bridge these divides and ensure that all stakeholders could engage meaningfully in the process. Moreover, the challenge of measuring the impact of participatory co-governance and the limitations imposed by ready-made NBS solutions sometimes restricts the creativity and flexibility that are necessary for effective problem-solving. Despite these challenges, Strovolos pilot adopted a range of risk mitigation strategies that allowed it to navigate these complexities and build momentum for successful NBS implementation. The pilot emphasizes flexibility and adaptability within its governance framework, allowing for adjustments as needed to maintain stakeholder engagement and overcome logistical hurdles. By involving project managers to mitigate delays and clearly defining roles and responsibilities, the project created a structured approach that should try to ensure progress despite the challenges posed by multiple stakeholders. The engagement of technical consultants and experts results as instrumental in ensuring that proposed solutions are feasible from legal, technical, and financial perspectives. Narrowing the intervention area has been another strategy that helped focus efforts and maintain stakeholder interest. Identifying common goals that align with the priorities of various governmental departments is helping in an increased buy-in from these entities, thus ensuring greater support for the initiative. To address the complexities of communication and ensure equal representation, the pilot is adopting several key strategies. These include preparing clear and focused meeting discussions, using local dialects and informal language to enhance communication, and providing complementary tools to address the varied abilities and preferences of participants (such as analogue, digital, textual, verbal, and visual methods). Structured communication channels and regular feedback loops are established to ensure transparency and responsiveness throughout the process. Additionally, the pilot introduced training to improve stakeholders' governance skills and is creating incentives for participation, fostering a sense of ownership and commitment. Strovolos pilot highlights the importance of flexibility, clear communication, and inclusive methodologies in overcoming the challenges inherent in participatory processes. By addressing the barriers of trust, technology gaps, and stakeholder conflicts, the project is trying to demonstrate that, with careful planning and adaptation, meaningful engagement is possible even in complex environments. The experience

offers valuable lessons on how to design participatory processes that are both inclusive and effective, with a strong focus on building trust, ensuring equal representation, and maintaining long-term engagement.

Final remarks for Estarreja Pilot

The implementation of Nature-Based Solutions (NBS) in Estarreja through a participatory approach is a complex yet enlightening journey, shaped by a variety of challenges and lessons. The process is underscoring the importance of addressing systemic barriers, such as resistance and mistrust toward participatory processes, a lack of a participatory culture, and limited maturity among local entities regarding inclusive engagement. Overcoming these challenges requires significant effort to foster trust and create a foundation for long-term collaboration, particularly given the time-intensive nature of building meaningful stakeholder relationships. Estarreja pilot is also facing practical difficulties, including turnover among key stakeholders, diverging priorities, and conflicts of interest, all of which necessitates adaptive strategies to maintain momentum. The challenges of coordinating diverse agendas, managing workloads, and navigating bureaucratic and GDPR-related constraints further highlights the need for efficient and transparent processes. Additionally, the pilot grapples with the broad scope of its objectives and the complexity of engaging stakeholders across a large and diverse territory, particularly in a context where awareness and interest in nature conservation topics are limited. Despite these obstacles, the Estarreja pilot is demonstrating resilience by employing innovative risk mitigation strategies. A targeted engagement approach has been adopted, involving specific stakeholders only in relevant activities to minimize conflicts of interest and streamline participation. The inclusion of technical consultants and experts ensures that proposed solutions are legally, technically, and financially viable. By prioritizing the implementation of solutions before electoral transitions, the pilot is trying to mitigate the risk of political delays. Structured and tailored communication strategies play a pivotal role in fostering trust and facilitating collaboration. Customized communication approaches for different stakeholder groups, coupled with the validation of solutions in a transparent and impartial manner, are critical in addressing skepticism and aligning diverse perspectives. Estarreja pilot is demonstrating that while co-designing NBS with vulnerable populations is inherently challenging, it is also deeply rewarding. This experience highlights the importance of patience, continuous learning, and the commitment to building a shared vision for nature conservation and community resilience.

Final remarks for Barcelos Pilot

Barcelos' pilot is illuminating the intricate challenges and opportunities inherent in implementing Nature-Based Solutions through a participatory approach in a context with limited experience in collaborative decision-making. The process requires addressing deep-seated resistance, prejudice, and mistrust toward participative processes, compounded by a lack of a participatory culture and institutional maturity among local entities. These challenges highlight the importance of fostering trust and building the capacity for long-term engagement. The involvement of diverse groups, including students of varying ages and educational levels, adds another layer of complexity. Tailoring participatory methods to effectively engage and integrate these groups requires significant effort and creativity. Additionally, integrating the participatory process within local regulations for playground within schools presents a unique challenge, particularly given the innovative and sometimes disruptive nature of this NBS compared to more conservative local and national regulatory frameworks about these kinds of spaces and the activities children are supposed to do in them. The definition of roles in decision-making, especially regarding who can vote on budgetary issues, raises important questions about inclusivity and transparency. The pilot also navigates strict timelines, addresses stakeholder perceptions of potential risks, and overcome difficulties in transmitting ancestral knowledge related to the benefits of playing in natural context—an essential component of contextualizing NBS solutions within the local cultural heritage. Securing resources, funding, and covering maintenance costs further underscores the practical challenges associated with ensuring the long-term sustainability of the interventions. To address these challenges, Barcelos pilot is planning to adopt several key risk mitigation strategies. Technical consultants and experts are engaged to ensure that all proposed solutions are legally,

technically, and financially feasible, trying to provide a strong foundation for implementation. Extensive awareness-raising efforts are undertaken to educate stakeholders, especially children and teachers, about NBS, climate change, and the risks and benefits of a closer relationship with nature. This approach was critical in shifting perceptions and fostering broader support for the project. Flexibility is another cornerstone of the Barcelos pilot. By maintaining adaptable plans, the team is trying to respond to evolving circumstances and stakeholder feedback effectively. The focus on raising awareness and aligning participatory processes with local cultural values is helping bridge the gap between innovative NBS concepts and traditional practices, ensuring both relevance and acceptance. By addressing resistance and mistrust head-on and working to integrate ancestral knowledge with innovative solutions, the pilot is trying to set a valuable precedent for balancing tradition and progress. Its success will serve as a beacon for future initiatives seeking to implement NBS in similar contexts with cultural, regulatory, and social challenges that are relatable with the pilot, showcasing how collaborative processes can lead to resilient and sustainable outcomes.

Final remarks for Rome Pilot

Rome pilot exemplifies the complexities and rewards of implementing Nature-Based Solutions (NBS) in a highly urbanized and historically significant setting. Undertaking a participatory approach in such a diverse and layered context brings unique challenges that require creative and adaptive strategies to navigate. A key hurdle is building consensus among stakeholders with varying priorities, agendas, and levels of engagement, especially the Superintendency to the archaeology of Rome. Practical issues, such as difficulties in synchronizing workloads, timing, and procedures across diverse stakeholder groups, especially the needs of the II Municipality to define a preliminary project by the end of 2024 and the longer timeline of the participatory process in TRL project, compounds these challenges. Further complicating the process are the variable timelines associated with construction sites managed by the municipality, as well as the allocation of adequate budgets for NBS interventions in both pilot's sites. The pilot is also facing site-specific constraints, including the presence of archaeological regulations that limited interventions in public spaces, and ecological and physical challenges such as restricted access to water resources for irrigation in Via De Lollis site. These factors underscored the need for both creativity and flexibility in planning and implementing NBS in Rome. To overcome these challenges, Rome pilot is adopting several risk mitigation strategies. The project has been divided into two different areas (Via De Lollis and via Scarpa) to engage different students(elementary students and phd students) and to eventually have two different typologies of Green Classrooms in place. Activities are tailored to the needs of specific audiences, such as elementary school students and PhD researchers, ensuring that engagement efforts are both inclusive and impactful. Parallel consultations and activities with different stakeholder groups helped streamline the process, reducing delays and maintaining momentum. The involvement of technical consultants and experts provides essential guidance on technical feasibility, particularly in specialized areas such as agroforestry, green classrooms, and child-focused participation. Moreover, maintaining flexibility in plans allows the pilot to adapt to changing circumstances and constraints, ensuring continuity and progress despite external uncertainties. Rome pilot highlights the importance of pragmatism, innovation, and inclusivity in co-designing NBS within complex urban environments. By embracing flexible and adaptive strategies, the pilot is trying to navigate a challenging landscape of ecological, historical, and social constraints. This experience not only underscores the value of participatory processes in addressing urban sustainability challenges but also serves as an inspiring model for future initiatives seeking to harmonize ecological resilience with the unique character and needs of densely populated and historically rich cities.

Final remarks for Roskilde Pilot

Roskilde pilot underscores the complexities and opportunities of implementing Nature-Based Solutions (NBS) in a context where associations operate within precarious and semi-informal structures, and participation is primarily voluntary. While the flexibility and grassroots nature of such associations can foster innovation and community-driven solutions, these same characteristics pose challenges in securing strong, sustained commitment from stakeholders. Voluntary participation often translated to fluctuating levels of engagement, making it difficult to

maintain momentum and continuity throughout the project. The semi-formal nature of the associations also presented organizational and governance challenges, requiring the pilot to adopt a flexible and adaptive approach to ensure progress. A key strategy to address these challenges is the continuous re-negotiation and adaptation of aims and goals. This iterative process allows the project to remain aligned with the evolving capacities, priorities, and interests of the stakeholders involved. By embracing adaptability, the pilot ensures that all participants feel valued and that their contributions are integrated into the project's direction. This approach also fosters a sense of shared ownership, encouraging stakeholders to remain engaged despite the inherent uncertainties of a voluntary and informal framework. Roskilde pilot demonstrates the importance of flexibility, open dialogue, and iterative planning in contexts where formal structures and guarantees of commitment may be limited. By prioritizing adaptability and inclusivity, the pilot is trying to be able to navigate the challenges of semi-formal participation and lay the groundwork for sustainable and community-supported NBS initiatives. This experience serves as an inspiring model for other projects working in similar contexts, showcasing how re-negotiation and the alignment of goals with stakeholder realities can overcome organizational constraints. The Roskilde pilot ultimately highlights the transformative power of participatory approaches, even within less formalized frameworks, in fostering resilient and sustainable environmental solutions.

Final remarks for Azores Pilot

Azores/Lagoa pilot serves as an insightful example of the complexities involved in implementing Nature-Based Solutions (NBS) through participatory processes in a unique island context. While the initiative aims to foster inclusive engagement, the diversity and sheer number of stakeholders involved introduces significant challenges. Balancing the differing priorities, expectations, and occasional conflicts of interest among stakeholders required careful navigation and a commitment to consensus-building. Coordination proves to be another significant challenge, as the need to align agendas, workloads, timing, and procedural requirements of various stakeholders adds logistical complexity. The process is further hindered by the inherently time-consuming nature of participatory approaches, requiring substantial patience and persistence. Compounding these challenges are adverse climatic conditions, which often disrupted outdoor activities essential to the NBS implementation process for transforming a trail into a therapeutic pathway, necessitating additional flexibility and adaptive planning. Despite these hurdles, Azores/Lagoa pilot employs effective risk mitigation strategies to maintain progress and engagement. Recognizing the importance of flexibility, the project team adapts schedules to accommodate stakeholders' needs, ensuring that activities could proceed with maximum participation despite conflicting commitments or unforeseen delays. The inclusion of ICT experts proved invaluable in managing technological challenges during online activities, enabling effective virtual collaboration when in-person engagement is impractical. The pilot underscores the importance of adaptability, technological integration, and stakeholder-centered approaches in participatory processes. By remaining flexible and leveraging digital tools to bridge gaps in participation, the project is trying to be able to navigate logistical and climatic challenges effectively. Through these efforts, the Azores/Lagoa pilot is not only contributing to the development of locally tailored NBS but also demonstrates the potential of participatory approaches to unite diverse voices in pursuit of sustainable solutions.

Final remarks for Càceres Pilot

Cáceres pilot represents a compelling journey toward fostering a participatory culture in the implementation of Nature-Based Solutions (NBS). In a region where resistance, prejudice, and mistrust toward participatory processes persist, the initiative is faced with significant challenges in overcoming entrenched habits of top-down decision-making and the inertia of a centralized system. A lack of participation, coupled with limited maturity and trust among local entities regarding inclusive engagement, adds further complexity to the process. Coordination among stakeholders is another significant hurdle. The difficulties in aligning agendas, workloads, timing, and procedural requirements of diverse participants often tested the adaptability and perseverance of the project team. Delays in the implementation of laws and the influence of vested interests in conventional solutions slows progress, reinforcing the need for persistence and strategic engagement. Additionally, the perception that highly technical issues or those not directly

involving citizens are irrelevant or difficult to be addressed by local citizens hindered broader community participation. These challenges are compounded by the time-intensive nature of participatory processes and the practical difficulties of securing resources, funding, and covering long-term maintenance costs. Despite these barriers, the pilot demonstrates resilience and innovation through its risk mitigation strategies. A key approach is the establishment of an on-demand advisory service to support different municipalities with their different needs and challenges. This service provides essential guidance and expertise, ensuring that local authorities are equipped to navigate the complexities of participatory processes and NBS implementation. By offering tailored support, the pilot addresses gaps in capacity and helps municipalities adopt more inclusive and effective practices. The Cáceres pilot highlights the importance of persistence, and a commitment to cultural transformation in participatory governance. While the journey is challenging, the pilot lays the groundwork for a shift toward more collaborative and inclusive decision-making processes for the transformation from centralised to decentralised systems in biowaste management. It can possibly demonstrate that, with consistent support and engagement, even communities accustomed to top-down approaches can begin to embrace participatory methods that empower citizens and align with sustainable, nature-based solutions. This experience can offer valuable lessons for similar contexts, emphasizing the need for continuous capacity-building, stakeholder engagement, and strategic resource allocation.

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Annexes

The following annexes bring together the detailed Implementation Plans for the eight pilot cases, showcasing the outcomes of the co-design processes carried out under Task 5.2. These plans, presented through both graphic and textual materials, provide a comprehensive roadmap of the participatory strategies employed in each pilot. They highlight the unique pathways adopted to navigate the complexities of stakeholder engagement, local challenges, and environmental considerations. Central to these plans is the clear definition of all the critical "moments" in the participatory process, offering an in-depth look at the structured phases that guide each project. These moments span from initial co-diagnostic activities, where challenges and goals are collaboratively identified, to more advanced stages like exploratory and executive co-design workshops, participatory budgeting sessions, and the formulation of actionable plans. Each phase reflects a tailored approach, adapted to the specific socio-economic, cultural, and ecological contexts of the pilot locations. The plans also document the challenges and issues that arose or are expected during each stage of the process. Each challenge is contextualized within its respective "moment," offering insights into how these obstacles affected progress and shaped decision-making. To address these issues, each plan elaborates on the risk mitigation strategies employed by the pilots. The mitigation approaches are described in detail, illustrating how they were adapted to the nuances of each pilot and effectively integrated into the overall co-design process.

Annex 1: Brussels Implementation Plan

Brief description of the pilot: The pilot seeks to address local socio-economic and ecological needs using Nature-Based Solutions (NBS) to mitigate flooding, enhance biodiversity, and improve social cohesion in the zone PRIOR Laeken (Priority Intervention Zone), For now, the pilot actions are focused on the Verregat neighborhood in Laeken, targeting improved integrated stormwater management (ISWM) through co-creation with local residents, associations, and the Comensia social housing cooperative. This pilot Verregat's selection is based on its upstream watershed position, green infrastructure, and active community, enabling feasible infiltration projects and participatory processes.
Additional initiatives may arise in other areas of PRIOR Laeken within the pilot case, where the social and environmental conditions are met.

Co-define challenges and goals:
Description of the step:
The goals of the pilot were defined based on the findings from the participatory mapping (D4.2), discussions with municipal agents, the needs of grassroots associations, and an ecological assessment. They were also aligned with the priorities outlined in the Municipal Water Plan.
Regarding the challenges, most were identified in D5.1 after mapping the participatory culture, holding meetings with grassroots associations, and based on previous co-creation experiences within our municipality. These insights helped shape the direction of the pilot and anticipate potential obstacles in its implementation. The goals of the pilots are to improve water infiltration through the soil in numerous places in Laeken, reduce rainwater discharge into sewers, mitigate environmental challenges like flooding and heat islands, and enhance biodiversity. This will be reached by working on social cohesion with activities designed to engage the community in co-designing ecological solutions that meet local socio-economic and environmental needs.
Issues, challenges, roadblocks:

- Community Engagement: Lack of Awareness and diverse interest: Limited knowledge of ISWM (Integrated StormWater Management) and NBS hinders participation + varied community priorities (private owners vs Comensia, etc.) complicate consensus-building.
- Institutional Barriers:
    - Need for excellent coordination among municipal agents, grassroots organizations, and other stakeholders can lead to delays and misalignment of goals.
- Conflicting priorities within Brussels City departments given the budget constraints hinder the implementation of certain co-design ideas.
- Ecological Constraints:
    - Poor infiltration soil properties may limit the effective water infiltration solutions.
    - High urbanization limits space for implementing NBS.

Results, outputs, outcomes (expected or achieved): On the long term, we aim to do the following:
Results: Enhanced community understanding of ISWM and NBS through targeted workshops and participatory mapping activities. Establishment of collaborative frameworks with Comensia and other local associations and with the Verregat citizens. *(achieved or in progress, continuous work throughout the project)*
Outputs: Development of a comprehensive participatory mapping report detailing local (ecological and social) needs and potential solutions. *(expected)*
Outcomes: Improved water infiltration rates in targeted areas of Laeken, contributing to reduced flooding and heat island effects. Strengthened social cohesion and community involvement in the Verregat neighborhood. Increased biodiversity through the implementation of green infrastructure, such as planted ditches and infiltration ponds. *(expected)*
Risk Mitigation:
Community awareness and engagement: We raise community awareness of ISWM and NBS through targeted workshops and engage diverse stakeholders early to align interests and enhance collaboration. In order to increase participation rate, increase visibility to local events and use all possible tools (door to door campaign, etc.) to interact individually with citizens.

Ecological and local constraints: Implementation of site-specific solutions, taking into account both on-site measurements, people willingness. In order to gain trust and build engagement, starting with smaller projects or priority demands will be evaluated (eg: water tanks in Comensia building)
Early engagement with key stakeholders: Involvement of municipal departments early in the co-design process, and continuing to align, if possible, pilot goals with existing city planning priorities (e.g., the Municipal Water Plan, Climate Plan, PCDD, etc.), open and regular discussion with key stakeholders such as Comensia, grass-root associations and involved citizens.
Stakeholders involved or to be involved in this step:
By October 2024
The Brussels municipality (mainly the climate team and the Brussels citizen participation unit), grassroot associations, citizens from Laeken and Jette, and the Comensia social housing cooperative will be key stakeholders in the pilot project, contributing to the co-design process and ensuring that local needs and priorities are addressed. Comensia, as the social housing cooperative, will play a critical role in facilitating engagement with residents and ensuring that solutions are aligned with social housing goals.
After October 2024
For technical aspects related to the construction and implementation of Nature-Based Solutions (NBS), Brussels Environment may be consulted for expertise on Integrated Stormwater Management (ISWM). Involvement of the consortium member UCLouvain regarding unlearning aspects is planned.
Tools:
> One-to-one meeting
> Door to door campaign
> Non-structured interviews
> Survey on participatory culture (T4.2)
> Involvement in social events
> Co-diagnostic event (Walkthrough - June 2024)
> Awareness/unlearning events (Sewer museum visit, peer exchanges and debunking myths - Sept/Nov 2024
Timeline :
July 2023 - November 2024

List of relevant NBS:
Description of the step: Ponds, infiltration and planted ditches, roof gardens, community gardens, etc. Numerous NBS have already been installed in Brussels. However knowledge about them and replicability is low. The project builds on previous NBS projects (Verregat park, BrusseauBis experiences) within the City and at regional level.
Issues, challenges, roadblocks: Several myths are associated with these Nature-Based Solutions (NbS), such as: "Water will accumulate in my yard, ponds will attract mosquitoes, my garden will be underwater all the time, which poses risks for children, etc." In addition to awareness-raising activities (sewer museum visits, informative sessions, door-to-door explanations), a debunking session will be held in October with the assistance of citizens who have already implemented this kind of solution."
Results, outputs, outcomes : Increased NbS awareness (continuous tasks and activities), Implementation of Nbs related to ISWM (expected)==> decrease of local overflows and floods.
Risk Mitigation: Debunk of the myths.
Stakeholders involved or to be involved in this step:
NbS ideas could be brought by the following stakeholders within the project:
> Brussels Environment (Eau | Guide Bâtiment Durable)
> Brussels Municipality
> Citizens
> Comensia (social housing cooperatives)
Are there any tools or methods the pilot is using in this step?
> Serious Geogame and NBS cards in order to select the NBS to implement
Timeline :
July 2024 to June 2025

Co-governance model:
Description of the step:
Our co-governance model is founded on a partnership of three key stakeholders working together to ensure the project's success: the Brussels Municipality, Comensia, and citizen representatives from the neighborhood. Regular interactions, through meetings and phone calls, enable the exchange of ideas, the sharing of responsibilities, budget management, and coordinated action planning.
Issues, challenges, roadblocks:
> Maintaining active participation from the community representatives has proven challenging, especially over an extended period. Some citizens express a desire for quick, tangible actions, while others are more focused on conceptual discussions and long-term planning, leading to differences in expectations and priorities
Results, outputs, outcomes:
> Several activities were organized with key stakeholders, including walkthroughs, workshops, barbecues, and more, to encourage engagement and collaboration. (achieved)
> Initiatives were undertaken by other stakeholders to advance the project, such as the rehabilitation of water cisterns by Comensia. (achieved)
> Willingness to create a non profit association supported by Comensia but led by community representatives (expected)
Risk Mitigation:
> Develop activities that include both quick-win actions (e.g., tangible projects such as presentations by other citizens on sustainable water management or practical activities like infiltration tests) and conceptual initiatives (e.g., walkthroughs, co-creation workshops, etc.)."
Stakeholders involved or to be involved in this step:
> social housing cooperative (Comensia)
> citizens representatives
> Brussels municipality
Additional Comments: /
Timeline (expected or achieved): September 2024 - October 2026

LKL Formalized:
Description of the step: One Living Knowledge Lab has been created in the Verregat neighborhood, and brings the following stakeholders together: Municipality of Brussels, Comensia, House of Rosemary, and representatives from citizens' associations. If other Living Knowledge Labs (LKLs) are initiated in other areas of the PRIOR zone Laeken, they may involve additional stakeholders.
Issues, challenges, roadblocks:
> Some LKL members are eager for quick action, but the slower pace of the project cycle can lead to discouragement.
> Activities must be coordinated to include stakeholders with diverse and sometimes conflicting agendas.
> Efforts should balance and address the varying interests and expectations of all stakeholders.
Results, outputs, outcomes (expected or achieved):
> First informal meeting with each stakeholders to understand how they work, their motivations and interests (achieved)
> Gathering meeting organised with all representatives after 6 months of research and discussion (achieved)
> Regular meetings/phone calls with stakeholders to plan for further activities and align interest (in progress
Risk Mitigation: N/A
Stakeholders involved or to be involved in this step:
The Living Knowledge Lab (LKL) has been formalized and is composed of members from Comensia, a social housing cooperative, members of the cooperative house Romarin, citizens from the neighborhood committee, and municipal agents.
Are there any tools or methods the pilot is using in this step?
> One-to-one meeting
> Non-structured interviews

Timeline (expected or achieved):
> March 2024 - December 2024

Co-diagnostic activities:
Description of the step: Participatory walks, door-to-door exchanges, and one-on-one interviews were conducted. An inventory of all water tanks in Comensia buildings has been completed to repair and reactivate them. This serves as a first small step to build trust with the community, address a clear priority demand, and carry out quick actions.
Issues, challenges, roadblocks: Difficulties to have a broader engagement of the whole neighborhood and diversity within the participants.
Results, outputs, outcomes: Diagnostic map of the main concerns and problematics. Indicating potentialities for Nbs Implementation *(in progress)*. Inventory of the situation of water tanks in Comensia's building and indication of potentialities in the surroundings *(achieved)*. Thanks to the inventory of water tanks conducted, it was possible to convince the building manager of the utility of Nature-Based Solutions (NbS) and to reflect on the potential opportunities these solutions can provide.
Risk Mitigation: Following the activities: Risks have been tackle through: - Increased engagement (door-to-door campaign) - Activities on debunking Myths - Implement quick-wins activities and practical activities
Stakeholders involved or to be involved in this step:
> Citizens
> social housing cooperative (Comensia)
> local association (Rosemary House)
> Brussels municipality (participation, climate and cartography unit)
Tools:
> GIS Datasets (Brussels regio, Brussels municipality, Comensia)
> Walkthrough
> One-to-one interview
Timeline (expected or achieved): May 2024 to December 2024

New Data produced :
Description of the step: During co-diagnosis activities (such as walkthroughs, door-to-door campaigns, interviews, etc.), data have been collected through various formats to create a map that highlights the local situation, key problems, missing infrastructure, unused spaces and other pertinent details. This data are used in order to define our co-creation activities,

Issues, challenges, roadblocks:
> New data produced through co-diagnosis activities may be relevant to some but might not reflect everyone's reality in the neighborhood, highlighting the challenge of integrating marginalized communities.
Results, outputs, outcomes: Co-creation of a map highlighting the potentialities of the neighborhood (under finalization)
Risk Mitigation:
> Work with Comensia and House van Rosemary to include the marginalized communities and knowledge
Stakeholders involved or to be involved in this step:
> Citizens
> social housing cooperative (Comensia)
> local association (Rosemary House)
> Brussels municipality (participation, climate and cartography unit)
Are there any tools or methods the pilot is using in this step?
> Walkthrough
> Door-to-door approach
Timeline (expected or achieved): June to December 2024 + regular basis

Co-design workshop (exploratory co-design):

Description of the step: Three events are planned for the exploratory co-design phase: - Debunk of myths linked to ISWM and NbS + mapping the potentialities in the neighborhood - Participative works in order to test soil infiltration in interesting zones and private gardens and to start reflecting on what NBS could be implement - Photovoice workshop framed as to reinvent their neighborhood - Co-design workshop with NbS cards will also be organized early 2025. In previous activities, collection of ideas has been made through: ideas-box, door-to-door reflection, on-site personal visits, etc.
For private owners, co-design workshops could be organized on demand and more on a regular basis with citizens co-designing together their own NBS with the help of their neighbours.
Issues, challenges, roadblocks: There is always a risk that the priorities raised by the citizens are not in line with what's possible within the project (working on streets renovation for the whole neighborhood while budget is limited.)
Results, outputs, outcomes (expected or achieved): Citizens will have a better understanding of Integrated Stormwater Management (ISWM) and Nature-Based Solutions (NbS) through myth-debunking sessions and workshops, fostering informed participation. Mapping of neighborhood potentialities, soil infiltration testing, and Photovoice workshops will identify suitable areas for intervention and gather creative ideas from the community. Through the co-design workshop and NbS card sessions, tangible, community-driven solutions will be developed, tailored to both local priorities and project constraints. Small, quick actions, like repairing water tanks, will help build trust with citizens by addressing immediate concerns and demonstrating the project's responsiveness. The collaborative process will strengthen the social cohesion of the neighborhood, encouraging a sense of ownership over the ecological solutions co-created with municipality, Comensia, and other stakeholders.
Risk Mitigation: Necessity to realign rapidly the citizens asking for considerable changes with the reality and objectives of the project. See above for other risks and mitigations
Stakeholders involved or to be involved in this step:
> Citizens
> social housing cooperative (Comensia)
> local association (Rosemary House)
> Brussels municipality (participation, climate)
Additional Comments:
Are there any tools or methods the pilot is using in this step?
> Photovoice
> Co-creation workshops prior to participatory works for private owners
> Walkthrough finalization and review based on the co-design workshops,
> NBS cards
Timeline (expected or achieved): December 2024 to mid-2025 + on regular basis

Co-design workshop (executive co-design):
Description of the step:
Community Scenarios for Comensia green spaces and public spaces for NBS planning + budgeting
> Organize separate groups with participants from diverse backgrounds (private owners vs renters, marginalized community, Comensia, authorities, etc.) to collaboratively create design scenarios, considering budget constraints and scoring criteria.
> Each group presents its scenario to the rest of the participants, creating room for discussion and prioritization.
> Use of NBS cards in combination with the online platform.
> This will be linked with the online participatory budgeting platform FaireBXLSamen to allow for broader participation
> Co-design workshops will integrate through the serious game tool a participatory budget allowing participants to prioritize the different actions.
Private Scenarios For NBS planning
> After a first brainstorming phase, a second co-design workshop would be organized to co-design in detail the NBS. These workshops would be opened to any participants in order to inspire future volunteers.
Issues, challenges, roadblocks:
> Lack of knowledge about the proposed NBS and their related benefits

> Risk of prioritizing personal interests
> Difficulty for some people to stay within budget
> Digital gap
> Time allocation for this kind of project (for private owners)
> Difficult for people to envision and imagine the situation after the implementation of NBS.

Results, outputs, outcomes (expected or achieved):

> Creation of a final design agreed and shared with the neighborhood.
> Participants gain a better understanding of NBS, their benefits, and practical applications.
> Co-design workshops for public spaces inspire private owners and other residents to initiate or support future NBS efforts.
> Scenarios are collaboratively reviewed and refined to reflect diverse interests and ensure neighborhood buy-in.

Risk Mitigation:

> Possibility to split this phase into smaller areas. To start with a "demonstration area", implement the NBS and then, create another co-design for other areas.
> Use of NBS cards and visual tools to make concepts tangible and easier to grasp.
> Facilitate discussions to ensure collective goals take precedence over individual preferences.
> Offer offline opportunities to participate, such as in-person workshops and printed materials.
> Start with a "demonstration area" to showcase NBS impact before scaling up to other areas.

Stakeholders involved or to be involved in this step:

> Citizens (tenants and private owners)
> social housing cooperative (Comensia)
> local association (Rosemary House)
> Brussels municipality (participation, climate)

Additional Comments:

Are there any tools or methods the pilot is using in this step?

Digital Serious Geogame, NBS Cards, Brussels Environment tools (Parcelle Tools)

Timeline (expected or achieved): March-April 2025

Validation process with the stakeholders:
Description of the step: Not available yet
Issues, challenges, roadblocks: Not available yet
Results, outputs, outcomes (expected or achieved): Not available yet
Risk Mitigation: Not available yet
Stakeholders involved or to be involved in this step: N/A
Additional Comments:
Are there any tools or methods the pilot is using in this step?
Timeline (expected or achieved): N/A

Action Plan:
Description of the step: Not available yet
Issues, challenges, roadblocks: Not available yet
Results, outputs, outcomes (expected or achieved): Not available yet
Risk Mitigation: Not available yet
Stakeholders involved or to be involved in this step: N/A
Additional Comments:
Are there any tools or methods the pilot is using in this step?
Timeline (expected or achieved):N/A

Finalized solution ready to be implemented:
Description of the step: Not available yet
Issues, challenges, roadblocks: Not available yet
Results, outputs, outcomes (expected or achieved): Not available yet
Risk Mitigation: Not available yet
Stakeholders involved or to be involved in this step: N/A
Additional Comments:
Are there any tools or methods the pilot is using in this step?

Timeline (expected or achieved): N/A

Implementation:
Description of the step: Not available yet
Issues, challenges, roadblocks: Not available yet
Results, outputs, outcomes (expected or achieved): Not available yet
Risk Mitigation: Not available yet
Stakeholders involved or to be involved in this step: N/A
Additional Comments:
Are there any tools or methods the pilot is using in this step?
Timeline (expected or achieved): N/A

Roadmap Workflow

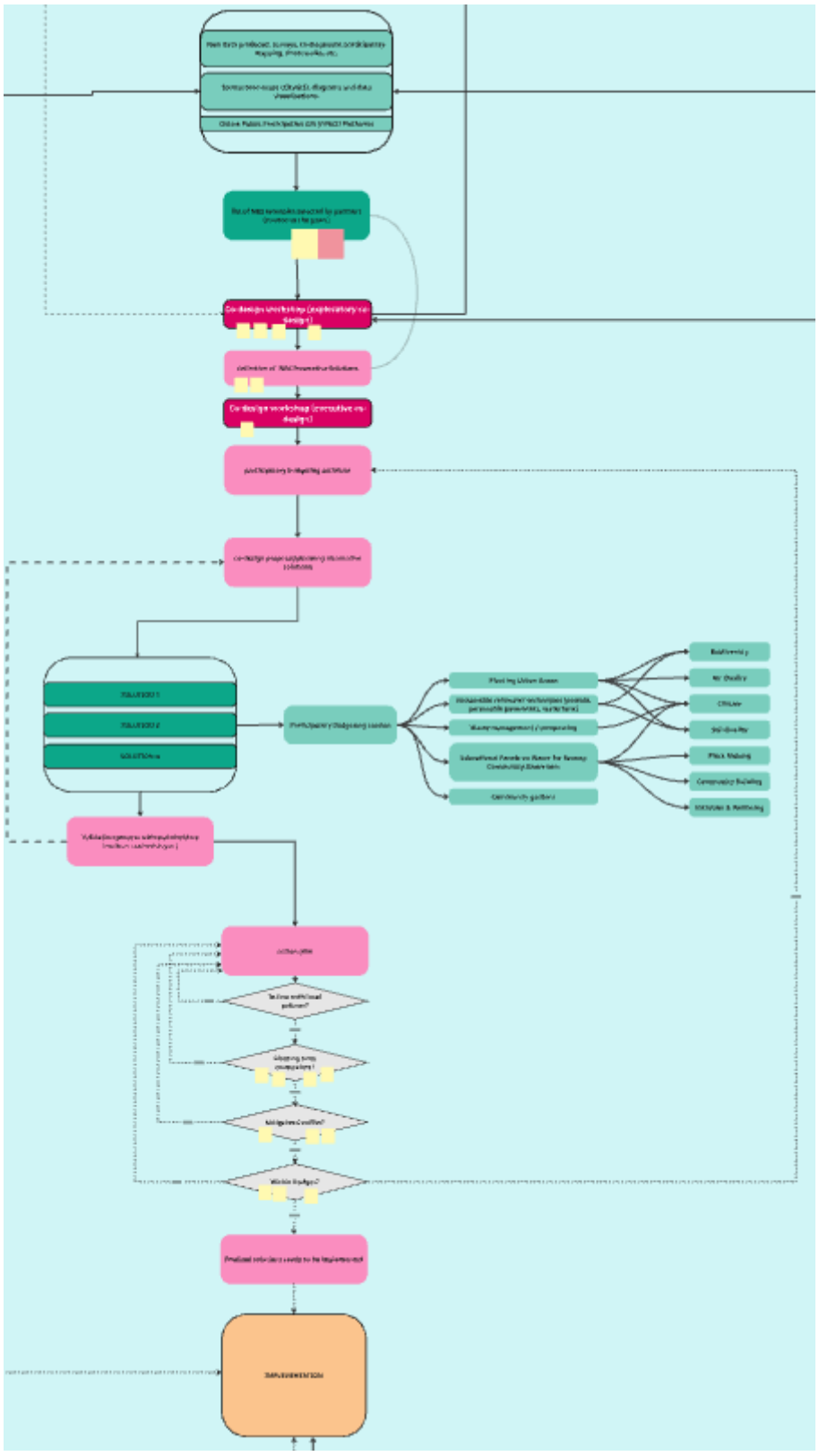

Figure 4: Roadmap Workflow for the Brussels Pilot (Author: Antoine Warrant)

Gantt chart of the “moments”

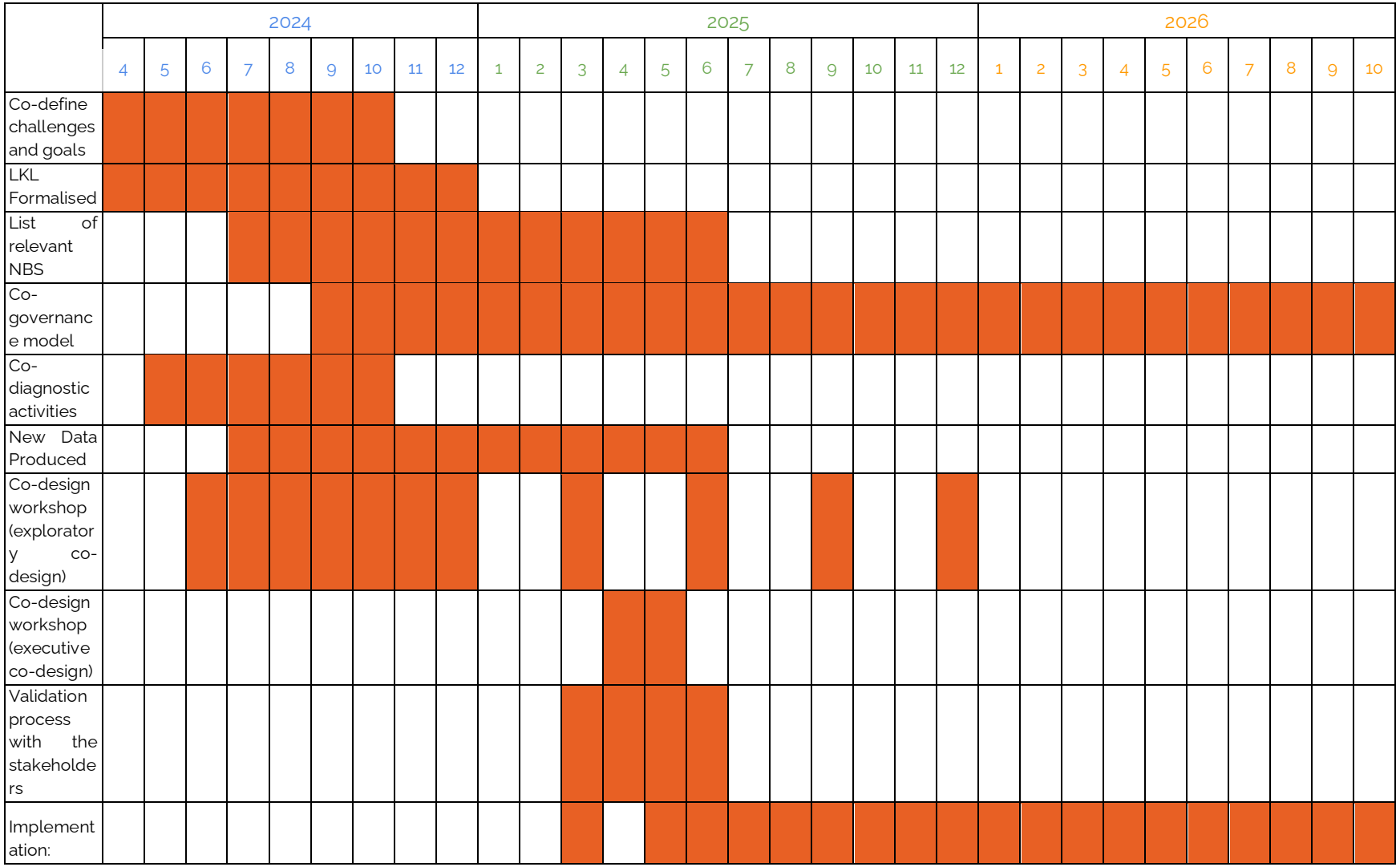

Table 5: Gantt Chart for Brussels Pilot Implementation Plan (Author: Antoine Warrant)

Annex 2: Strovolos Implementation Plan

Brief description of the pilot
The Strovolos Pilot explores opportunities for NBS Implementation in the area of Pedieos River Linear park, especially the segment that is highly connected with the historical centre of the municipality.
The Linear park, a green corridor running through four urban areas, is a central micro-mobility artery of the Nicosia region, creating vast opportunities for social public spaces along its path. Considering that, the selection of this pilot serves as an experiment for community-driven NBS implementation, through the establishment of a Living Knowledge Lab, involving the community, the authorities and relevant NGOs.
With the aim of our pilot's scalability, the goal is to create a Knowledge Hub that can inform future projects along the linear park on the methodologies and tools used to achieve an inclusive NBS along with an agile co-governance model.

Co-define challenges and goals
Description of the step:
Territory Exploration
Data gathering from Local Authorities:
> Meetings with the Municipality of Strovolos to discuss challenges regarding the Pedieos River Linear Park and the roadblocks of its developments
> Gather local plans and goals/expectations for the development of the Linear park
> Meetings with governmental agencies to explore opportunities for collaborations and identify common grounds for the goals of the NBS implementation
> Interview their perspectives on local participatory culture
Data gathering from online sources
> GIS data from online public repositories and open sources
> Studies, surveys, and research conducted for the Cyprus context and/or the pilot area
> Ethnographic material (photos, testimonies, stories) documented from other institutes, researchers, media, etc.
Issues, challenges, roadblocks:
> Main roadblock is to identify the responsibility of each governmental agency. Every intervention in the Pedieos River has to be accepted by different stakeholders, namely the Water Development Department, and the Department of Environment, while the responsibility of maintenance falls to the respective municipality (Strovolos in our case)
Results, outputs, outcomes:
> The public officers acknowledge the complexity of the situation but still each of them represents different perspectives of the area, leading to difficulties in communication and agreement.
Risk Mitigation:
> We try to narrow the intervention area to avoid complications and restrictions of the different governmental units, and therefore try to foresee any objections that may arise.
> We try to identify a goal that suffices the different governmental departments, to get more interested in being engaged**.**
Stakeholders involved or to be involved in this step:
By May 2024
> Municipality of Strovolos
> Governmental Departments (Water Development Department, Department of Forest)
> NGOs (Volt Cyprus, Birdlife, CEA)
> Community (Scouts, Adults Center)
After May 2024
> NGOs (OPU, Terra Cypria, ABLEBOOK, KyklOIKOdromio)
> Community (Strovolos' Initiative, Church)
Additional Comments:
We identified key persons in main stakeholders to communicate with directly. These contacts are convinced of the value of our activities and support us in mobilising their organisation accordingly. This way we overcome delays in stakeholder engagement in our planned activities.

Tools:
> One-to-one meeting
> Non-structured interviews
> Survey on participatory culture (T4.2)
> Online survey (with images of Pedieos River Linear Park)
> GIS datasets
Timeline:
July 2023 - May 2024 (updated Nov 2024)

LKL Formalized
Description of the step:
The Living Knowledge Lab of Strovolos includes a plethora of stakeholders involved with the pilot area. The process of stakeholders engagement brings together local authorities and governmental departments, as well as the local community with living experience of the area and organizations involved with related challenges,
This step is an effort to collaboratively discuss common issues and explore solutions for local challenges, bringing together diverse knowledge and expertise, primarily by acknowledging living experiences and living knowledge of the community.
Issues, challenges, roadblocks:
There is a challenge to:
> coordinate activities that multiple stakeholders with diverging agendas can participate
> meet the different interests and expectations of each stakeholder
> develop tools that enable information exchange and interpretation while promoting inclusivity and accessibility by all participants
Results, outputs, outcomes:
Overall the community and the different organizations appreciate the value introduced by the TRANS-L project, especially for Cyprus where participatory culture is very limited. They appear to be interested in the topic of NBS and especially the involvement of the community in decision-making.
Risk Mitigation:
We are implementing methodologies that allow equal representation of diverse voices, aiming for common understanding of each stakeholders perspective, trying to focus on common views and agreements between the stakeholders
Stakeholders involved or to be involved in this step:
> Local Authorities - Municipality of Strovolos is an Observer Partner of the TRANS-L project
> Governmental Departments
- Water Development Department (main owner of Pedieos River)
- Department of Forests (shared experiences on integrating environmental pedagogies in urban nature)
-Department of Environment
> NGOs
- Birdlife Cyprus (provided material for Pedios ecosystem biodiversity)
- ABLEBOOK (developed a mobile app to encourage inclusivity of people with disabilities)
- OPU (local citizen collective promoting sustainable mobility and citizen engagement) - CEA (an organization involved in various environmental projects)
> Local Community
- 76 Scouts System (kid and youth interested in environmental pedagogies)
- Strovolos Initiative (residents association for active citizenship and reservation of architectural, historical and cultural heritage)
Additional Comments:
We have approached and interacted with other stakeholders mapped in the area too but we proceed with the list above as these. were deemed the most representative and active for now. Other local stakeholders we communicated with included:
-Municipal Library
-Church
-Terra Cypria
Are there any tools or methods the pilot is using in this step?

> One-to-one meeting
> Non-structured interviews

Timeline:
July 2023 - May 2025

Co-governance model

Description of the step:
The focus will be on evolving participatory and collaborative activities into a structured, formalized co-governance model approved by all relevant stakeholders. Through the assessment of our pilot site's unique participatory culture, we aim to leverage these insights and trust-building efforts to lay the foundation for co-governance. This process involves in-depth evaluation of the current state of engagement, as well as identifying shared goals and expectations across stakeholders to ensure that the transition to co-governance is well-informed and widely accepted.
Key steps include defining clear roles, responsibilities, and decision-making processes that support collaborative ownership and accountability. We will place focus on building mechanisms that reinforce inclusivity and transparency, which are essential for a sustainable co-governance model. Regular feedback loops, capacity-building activities, and adaptive governance structures will be integrated to allow flexibility and responsiveness as the model evolves. Ultimately, the goal is to create a replicable and resilient co-governance framework that empowers different communities in Strovolos and ensures long-term stewardship of NBS.

Issues, challenges, roadblocks:
> Achieving alignment and commitment from diverse stakeholders will be challenging, as their priorities might conflict, and some may feel their influence is limited. This could lead to delays in formalizing governance structures.
> Decision-making complexity and power imbalances may slow the process, as certain actors, like local authorities or larger organizations, may dominate discussions, affecting the model's legitimacy and acceptance.
> Sustaining long-term engagement can be difficult, with participants potentially experiencing fatigue if the process feels too bureaucratic or disconnected from tangible outcomes. It will be important to create incentives to avoid disengagement.
> Building capacity is essential, as not all participants may have the governance or technical skills to contribute effectively. However, training to bridge these gaps requires resources, which may be difficult to secure.
> Legal and institutional constraints may complicate implementation.
> Accountability and transparency are critical for maintaining trust, yet creating accessible, open mechanisms for both is challenging, especially in areas with limited digital resources or initial resistance to open processes.
> Resource allocation and funding stability are vital for sustainability. Securing long-term funding beyond the TRL project's timeline will be challenging.
> Cultural and contextual differences across project locations mean that a one-size-fits-all approach to governance might not work, requiring flexibility and cultural sensitivity to adapt the model to local needs.
> Measuring co-governance outcomes is complex due to qualitative aspects, making it hard to show impact or justify further support without robust evaluation criteria.

Results, outputs, outcomes:
> Established Co-Governance Framework: A formal, well-defined co-governance structure will be created, outlining the roles, responsibilities, and decision-making processes among stakeholders.
> Policy and Strategy Documents: Documentation, including strategic guidelines, operational protocols, and roadmaps for ongoing co-governance.
> Stakeholder Engagement Tools and Methods: Development of engagement tools (like workshops, digital platforms, or guidelines) will facilitate continuous collaboration.
> Action Plans for Implementation: Concrete, actionable plans will guide the transition from traditional participation to co-governance, addressing phases, expected challenges, and critical milestones.
> Enhanced Trust and Collaboration.
> Increased Capacity and Skill-Building: Stakeholders will have improved knowledge and skills to actively contribute to and sustain co-governance efforts.

> Sustainable Decision-Making Processes.

Risk Mitigation:

> Establish structured, ongoing communication Channels to maintain engagement and ensure transparency.
> Establish regular feedback loops for conflict resolution.
> Define clear, agreed-upon roles and responsibilities and document these expectations.
> Build adaptability into the governance framework to adjust to changing needs or emerging challenges.
> Fund training or workshops to improve stakeholders' governance skills and foster an inclusive culture.
> Develop contingency plans to address participation fatigue or stakeholder turnover. Ensuring backup roles or rotating responsibilities can maintain continuity.

Stakeholders involved or to be involved in this step:

> Local Authorities - (Municipality of Strovolos)
> Water Development Department (main owner of Pedieos River)
> Other governmental departments
> NGOs (relevant to biodiversity, public space, accessibility/mobility, sustainability)
> Community Groups / Initiatives / Resident Associations
> Community Members / Local Residents

Additional Comments:

The aforementioned challenges should be considered and mitigation plans should be set in place as reaching an agreement for a co-governance model is a complicated, multi-stakeholder, and multi-faceted process.

Are there any tools or methods the pilot is using in this step?

> Digital collaboration platforms and tools like Miro
> Mapping and GIS tools
> Participatory Budgeting tools
> Survey and Feedback tools
> Co-Creation platforms and methods (i.e., X-Curve Framework or methods like Design Thinking)
> Monitoring and Evaluation Dashboards

Timeline:

May 2025 - Oct 2026

Co-diagnostic activities (Community)

Description of the step:

Co-Diagnostic Workshop - 19 July 2024

> Participation of community (local residents), NGOs and Municipal representatives (officers & elected).
> Co-defined challenges in three topics - 1. Biodiversity & Environment, 2. Accessibility & Mobility, 3. Public Space & Activities.
> Co-production of knowledge through local experiences, identification of challenges and unlearning.

Issues, challenges, roadblocks:

> Several participants were eager to impose their opinions. The moderator of the discussion had to adapt and allow everyone to share their views.
> Participants' ages varied between 30s and 70s, with minimum representation of youth.
> Time management and organisation of activities consider allowing enough time for discussions and not extend too much for the participants not get too tired

Results, outputs, outcomes (expected or achieved):

> The participants discussed the various challenges per topic, prioritised and evaluated them.
> The community felt valued and heard, but still hesitant of the extent their opinions will change local plans and processes.
> The participants acknowledged the importance of multidisciplinarity and the presence of experts in decision making, as well as the value of community and local knowledge being shared in such procedures.

Results, outputs, outcomes:

> community engagement in the identification of challenges at the pedieos linear park

> questionnaire given to participants, results essential for next steps of the project and the next workshops to be done
> education of the participants on the three topics, targeting the Pediaios linear Park
> proposition of strategic processes for the park improvement

Risk Mitigation:

> the CyI team tried to ensure age diversity in the working groups.
>The CyI team developed and provided complementary tools for knowledge elicitation to address all participants' abilities (i.e., analogue, digital, textual, verbal, visual means of communication)
> members for the CyI team were also facilitating the discussions, to avoid discussions on one specific topic only (i.e. cats topic)

Stakeholders involved or to be involved in this step:

> NGOs (OPU, Ablebook, Cyprus Energy Agency, Kykloikodromio)
> CyI expert (on biodiversity/environment) Christos Zoumides
> Local Authorities
> Local Community

Additional Comments:

> The participation of three (3) elected representatives - members of the City Council - and municipal officers, rendered the workshop a significant start to the LKL
> Elected representatives:

- Electra Panaretou Perdiki: President of the Committee on Adaptation to Climate Change and Environmental Development and member of other committees
- Ari Habeshian: President of the Committee on European Affairs, Research, Development and Innovation and member of other committees.
- Aikaterini Hadjistylli: Member of the Committee on Culture, Social Welfare Committee and others.

Are there any tools or methods the pilot is using in this step?

> Story Telling
> Visual Stories tool
> Digital materials, photos and Videos of the Pedieos park, to enhance their senses

Timeline:

July 2024

Co-diagnostic activities (Authorities)

Description of the step:

Authorities Active Involvement:

> Meetings to clarify and define possibilities for the extent of the NBS implementation
> Manage expectations of the community
> Ensure feasibility of design scenarios

Issues, challenges, roadblocks:

> Availability of involved stakeholders , this will create drawbacks on the timeline as the meetings might not finish by the end of Dec 2024, delaying the ending of the Co-diagnostic activities.
> Aligning the information shared by the authorities' officers. Oftentimes their diverging agendas make it hard to discuss the same topic with all of them. This also highlights the difficulty of coordinated operations across the departments of the government who operate in silos.

Results, outputs, outcomes:

Expected results are:
> The shared understanding of the objectives between the project goals and the stakeholders. this will help to minimise any misunderstandings and providing for a smooth project execution
> Create feasible and effective solutions tailored to the specific context and constraints, considering the local capacity and resources]
> Create a strong link between the stakeholders and the project as they will be needed during community engagement in the co-creation and co-design workshops

Risk Mitigation:

> Prepare meeting discussions to be on point and direct them towards the project's needs.

Stakeholders involved or to be involved in this step:

> Strovolos Municipality
> Water Development Department

> Department of Environment
> Department of Public Works

Additional Comments:

> The strong support we receive from the competent officers of the Municipality of Strovolos enable us to address the various officers of the governmental departments in the right context and at the right time to overcome misalignments between the agendas of these departments.

Are there any tools or methods the pilot is using in this step?

> One-to-one meeting
> Non-structured interviews with the support of project material and visual content (results of the co-diagnostic phase)

Timeline:

Dec 2024

New Data Produced (Learnings from the past)

Description of the step:

> Semi-Structured Open Interviews from local residents about traditional life, the history and their experiences of the historical neighbourhood. Their perspective on the development of the historical centre of Strovolos.

Issues, challenges, roadblocks:

> Depending on the interviewee we can't know the data produced.
> Unwillingness to participate.
> Time consuming method for interviews and specifically for transcribing.
> Depending on their educational background - difficulty to express the logic behind certain practices.

Results, outputs, outcomes:

> Traditional Local Practices for water management and construction methods (Possible Un-learnings)
> Traditional Local Lifestyle and changes over time of the societal needs
> Possible Innovative NBS or upgrades on already known NBS

Risk Mitigation:

> Structure of the questionnaire may change depending on the information gathered.
> Building trust with the residents participating - members of local NGOs.
> Transcript only relative information and themes.
> Express certain questions in a more informal way and use the Cypriot dialect for better communication.

Stakeholders involved or to be involved in this step:

> Relevant NGOs
> Active citizens from Strovolos

Additional Comments:

> Expected innovative NBS from traditional and local perspectives
> Further engagement with the community
> Building trust within active citizens which are members of local NGOs

Are there any tools or methods the pilot is using in this step?

>Audio and Visual Recording (camera and recorder) for the interviews

Timeline:

Nov 2024 - Feb 2025 (complete the interviews)
March 2025 - April 2025 (analyse the content of the interviews)

New Data Produced (Local Perspectives)

Description of the step:

> Editorial series of articles by community's social groups on local perspectives on different topics to be published in the TRL Community Website

Issues, challenges, roadblocks:

> Unwillingness to participate
> May not have an academic background to write formal texts
> Time consuming

Results, outputs, outcomes:

> Get their perspectives about already implemented plans
> Suggest proposals for improvement about the municipality
> Have a tool that could communicate their perspectives with the rest of the community
> Strengthen cooperation and trust with local NGOs
> Engagement with diverse and various age and social groups

Risk Mitigation:

> Explain the outreach they can have to the community and municipality - possible grow in members
> We can edit their final texts for grammar, orthography, syntax
> The articles could be twice a year so that each stakeholder produces them without problems

Stakeholders involved or to be involved in this step:

> Scouts (students 6-18yo)
> Scouts (leaders young adults)
> OPU (collective)
> Urban Sketchers (artistic view)
> Strovolos Initiative (traditional Perspective)

Additional Comments:

> We need to check with the stakeholders about any concerns they might have about timelines, size, format
> Topics could include: impact of nature to local microclimate and well being in Cyprus; benefits of active mobility; accessibility and inclusion in public space; learning from the past: how our ancestors lived with care for nature; biodiversity

Are there any tools or methods the pilot is using in this step?

> Communication by WhatsApp, Emails, Microsoft teams etc.

Timeline:

Nov 2025 - April 2025

New Data Produced (Data gathering - citizen science)

Description of the step:

ACTIONBOUND: Treasure hunt based on the biodiversity of the Pedieos river

> Learning activity for education through play.
> Reporting/Collecting local data for biodiversity from a citizen science perspective.

Issues, challenges, roadblocks:

> Unwillingness to participate or technical problems about downloading the app (and uploading the data collected).

Results, outputs, outcomes:

> Engagement of younger age groups of the community
> Education of younger age groups on the biodiversity of Pedieos
> Feedback and possible proposals for implementation along Pedieos

Risk Mitigation:

> Made the game friendly to users, easy to use, already tried it on the field to minimise technical concerns, created financial incentive for participation.

Stakeholders involved or to be involved in this step:

> Strovolos Municipality
> Community

Additional Comments:

If results and feedback is positive and if proposals are feasible then could be implemented on a larger scale or even on a permanent basis.

Are there any tools or methods the pilot is using in this step?

Online open and free application Actionbound

Timeline:

> Nov 2024 (test)
> January 2025 (evaluation)
> Possibly permanent installation in the NBS area

List of relevant NBS

Description of the step:

Selection of relevant NBS (by the research team) from various sources and develop a local NBS catalogue that will be used for co-design

Issues, challenges, roadblocks:

> Lack of knowledge/expertise of NBS by the participants
> Lack of technical knowledge
> Risk of eliminating creativity because of the pre-defined NBS (Participants will select from the given catalogue and avoid thinking of innovative NBS)
> Digital and physical tools to facilitate participation of diverse social / age groups

Results, outputs, outcomes:

> Catalogue of relevant NBS

Risk Mitigation:

> Simple and descriptive language to clearly communicate NBS to non-experts
> Real-life photo of NBS example to make it easy to understand
> Source and Best Practice to provide links for further info on each NBS
> Scales of impact of each NBS on the urban environment, nature, economy and society
> Engagement of technical consultants (from the municipality and DPW)

Stakeholders involved or to be involved in this step:

> Research Team
> Community
> Municipality

Additional Comments:

List of sources (NBS catalogues) :
>Politecnico Milano (2019). Catalogue of Nature-based solutions for urban regeneration
> 3PRO-TROODOS (2022). Manual for the construction of mountain drystone terraces in Cyprus. Deliverable D2.3c
> Climate ADAPT (2023). Establishment and restoration of riparian buffers
> URBAN GreenUp (2018). NBS Catalogue.
>Cyprus Energy Agency (2021). Nature-based solutions (NBS)

Are there any tools or methods the pilot is using in this step?

> MS Access
> MS Excel

Timeline:

July 2024 - February 2025

Participatory budgeting tool development

Description of the step:

Serious Geogame for Co-design and Participatory Budgeting CoPaB
Facilitate the co-design of scenarios with participatory budgeting exercises in a digital environment. Use of the relevant NBS catalogue for the adaptation of the digital serious geogame.

Issues, challenges, roadblocks:

> The main challenge is to engage digitally-savvy participants, and ensure that the scenario building procedure is democratic, just and inclusive
> How to associate NBS with the local context
> How to ensure a technical perspective on scenario development? The decision-making process should also consider the technical aspects of NBS implementation

Results, outputs, outcomes:

> Scenario building
> Game adaptation for use in different context (cultural and geographical)
> Integrate with GIS applications - and PPGIS platform

Risk Mitigation:

> Simplify tool to make it easy-to-use. Experiment with phygital use of the game (printed NBS Catalogue). Ensure at least one digitally-comfortable participant (game user)
> Scores-scales of NBS impact on city, environment, society, economy
> Mitigate by ensuring appropriate/relevant experts' participation in the related workshop..

Stakeholders involved or to be involved in this step:

> Research team
> user evaluation with stakeholders including schools, scouts, authorities officers

Additional Comments:
> As tested in the Researchers Night 2024 with school children, digital knowledge is not necessary to play the game. Its interface is very user friendly and streamlined for most groups to be able to play but Pw visual disabilities.
> Also it was noted by the user testing that the game triggers democratic reflexive processes and dialectic procedures of negotiation among groups of individuals for collective agreements on the type of NBS to be included in the design scenario to be proposed.
Are there any tools or methods the pilot is using in this step?
> HTML
> JAVASCRIPT
> CSS
> RENDER
Timeline:
November 2024

Co-design workshop (exploratory co-design)
Description of the step:
Community Scenarios For NBS planning + budgeting
> Separate groups with diverse participants to create design scenarios with budget restrictions and scoring
> Each group presents and discusses their scenario with the other participants. Explain prioritisation and selection.
> Scenarios could be used for voting or online discussion platforms to engage greater community.
Issues, challenges, roadblocks:
> Lack of technical knowledge for NBS implementation
> Lack of digital capacity
> Risk of prioritising personal interest of collective benefits
> Encourage innovative thinking (incorporate within the workshop's workflow)
Results, outputs, outcomes:
> Expected innovative / elaborated NBS
> 3-5 scenarios of specific budget with a written description / argumentation / narrative from the group.
> Prompts and AI generated images of the vision for the NBS implementation.
> Rate/Vote + comment on the produced scenarios
Risk Mitigation:
> Engage engineers (maybe students) to participate and offer a technical perspective in the separated groups
> Ensure youth participation in each group as game-users (possibly members of the researcher team)
> Include elected representatives / municipal officers
> Moderators to ensure just and fair procedures / decision-making
Stakeholders involved or to be involved in this step:
> Research Team
> Municipality
> Architecture / Civil Engineer Students
> Community
Are there any tools or methods the pilot is using in this step?
CoPaB - Digital Serious Geogame
Timeline:
March 2025

Co-creation workshop
Description of the step:
Hands-on NBS co-creation
> Create NBS with the community (tree planting, eco-furniture, etc.)
Issues, challenges, roadblocks:

> Community engagement might be low, with difficulties arising when mobilising the community members
> Technical expertise on NBS solutions
> Resources to create these NBS solutions through the workshop
> Weather conditions, summer in Cyprus is really hot

Results, outputs, outcomes:

> Community engagement in NBS solutions creation
> Community empowerment, increasing their capacity in maintaining and using the NBS solutions created
> Starting point for the successful implementation of the project through NBS solutions

Risk Mitigation:

> Identify the experts to provide the technical guidance and support for the creation of the NBS solutions
> Prepare the invite campaign on time
> Need of champions to monitor the state of the NBS creations

Stakeholders involved or to be involved in this step:

> NGOS
> Local Authorities
> Local Community
> Experts (students of architecture)

Are there any tools or methods the pilot is using in this step?

> Design / Construction Tools and Materials based on the decided NBS

Timeline:

April / May 2025

Co-design workshop (executive co-design)

Description of the step:

Finalising design proposal with the relevant Stakeholder and Experts (Technical).

Issues, challenges, roadblocks:

> Difficulty in scheduling the workshop with the busy decision-makers
> Delay of the workshop due to bureaucratic processes
> Dynamics among the participants may impact the purpose of the workshop

Results, outputs, outcomes:

> A shared vision for the Final co-Design Proposal
> implement an aligned strategy for the purposes of the project

Risk Mitigation:

> Create a clear agenda of the workshop
> Maintain deep engagement of stakeholders
> Support trustworthy processes of engagement

Stakeholders involved or to be involved in this step:

> Municipality
> Stakeholders (probably those stakeholders already involved in the co-diagnostic activities, as well as others)
> Experts

Are there any tools or methods the pilot is using in this step?

> GIS software
> Design software (autocad)
> Cost/benefit software / analysis
>viz tools & dynamic maps simulating scenarios (to be developed as an extension of the PPGIS platform and CoPaB - if possible).

Timeline:

May / June 2025

Validation process with the stakeholders

Description of the step:

This step will entail the validation of the final proposal by the community, including local residents and NGOs. A public deliberation will be held where the proposal will be presented, following the

previous co-design activities, ensuring that the presented proposal follows the local regulations and is commonly accepted by the respective governmental departments. During the public deliberation, the community will have the opportunity to pose questions, ask for clarifications and make final suggestions for the proposed NBS implementation.

Issues, challenges, roadblocks:

> Community members that haven't participated in previous activities, might strongly disagree with the proposal.

> People may take advantage of the forum for personal agendas or interests.

Results, outputs, outcomes:

> The validation of the design proposal with minor changes/suggestions,

Risk Mitigation:

> Ensure the presentation communicates the process that led to this proposal.

> Ensure the selected NBS are responsive to the challenges identified in previous activities.

Stakeholders involved or to be involved in this step:

> Organised by the research team in collaboration with the Municipality of Strovolos (and government's representatives)

> Participants - Open to public / NGOs / targeted social groups

Are there any tools or methods the pilot is using in this step?

> The public deliberation can be a hybrid event and offer streaming options for those who want to attend online

> MentiMeter could be used to gather opinions/questions/statistics

Timeline:

June / July 2025

Co-design proposals

Description of the step:

> This step involves the finalising of the design proposal by expert designers, taking into account the results of the steps undertaken up to this point.

> The co-design proposal will include architectural drawings and structural details with input from municipal engineers and following the guidelines of the respective governmental agencies and the budget restrictions.

> During this step, the proposal will be submitted for approval to the necessary offices.

Issues, challenges, roadblocks:

> Lack of coordination

> Delays / Bureaucracy

Results, outputs, outcomes:

> Approved design proposal

> NBS proposal drawings/plans

> Structural details (if needed)

Risk Mitigation:

> prior engagement of architects and env. engineers will ensure mitigation of any risks of technical nature

> prior rounds of participatory budgeting and close alignment with the Municipality officers will ensure that the scenario to be implemented fits the budget available, while any discrepancies will be adjusted in this step.

> long term onboarding of the appropriate technical staff throughout the process will ensure their full commitment in supporting the completion of this step.

Stakeholders involved or to be involved in this step:

> Research Team / Design Team

> Municipality

> Department of Public Works

Are there any tools or methods the pilot is using in this step?

> GIS

> Autocad

Timeline:

July - November 2025

Action Plan
Description of the step:
> The action plan will be structured as a schedule that will include the phases of the NBS implementation, the responsible persons for each task with their timeline and will be used for coordination throughout the implementation step.
> A breakdown of the different tasks needed for the NBS implementation, including professional and volunteer activities.
> Tasks may include contractor works and volunteering activities
Issues, challenges, roadblocks:
> Difficulty with coordinating the schedules of different stakeholders
> Capability to schedule the timeline of each activity / task
Results, outputs, outcomes:
> An implementation schedule / agenda shared amongst the key stakeholders
Risk Mitigation:
> The involvement of experienced project managers and engineers in the process will ensure the capacity of the team to mitigate any delays there might occur in the implementation of the planned works on site.
Stakeholders involved or to be involved in this step:
> Research Team / Design Team
> Municipality
> Department of Public Works
> Local community
> NGOs
Additional Comments:
> The involvement of the Department of Public Works will ensure the compliance of the works with the policies and regulations in the country.
Are there any tools or methods the pilot is using in this step?
>Gantt chart and detailed timetable of tasks
Timeline:
October - December 2025

Implementation
Description of the step:
The implementation of the NBS will include diverse activities besides the actual construction of NBS.
Namely:
> volunteering activities, for tree planting
> hand-on co-creation workshop in collaboration with NGOS
> presentation for dissemination and scalability / showcasing results, outcome, or at least expectations of results
Issues, challenges, roadblocks:
> Active / hands-on involvement of volunteers and the community requires wide communication / invitation to the activities, as well as wide participation.
Results, outputs, outcomes:
> Implemented NBS
> Community feeling of ownership / responsibility
> Dissemination and scalability of methodology and concept if co-governance model for inclusive NBS
Risk Mitigation:
> Engage the community in sharing/disseminating activities (word of mouth, social media, etc.)
Stakeholders involved or to be involved in this step:
> Research Team / Design Team
> Municipality
> Department of Public Works
> Local community
> NGOs
Timeline:

January - October 2026

Implementation Plan Roadmap Workflow

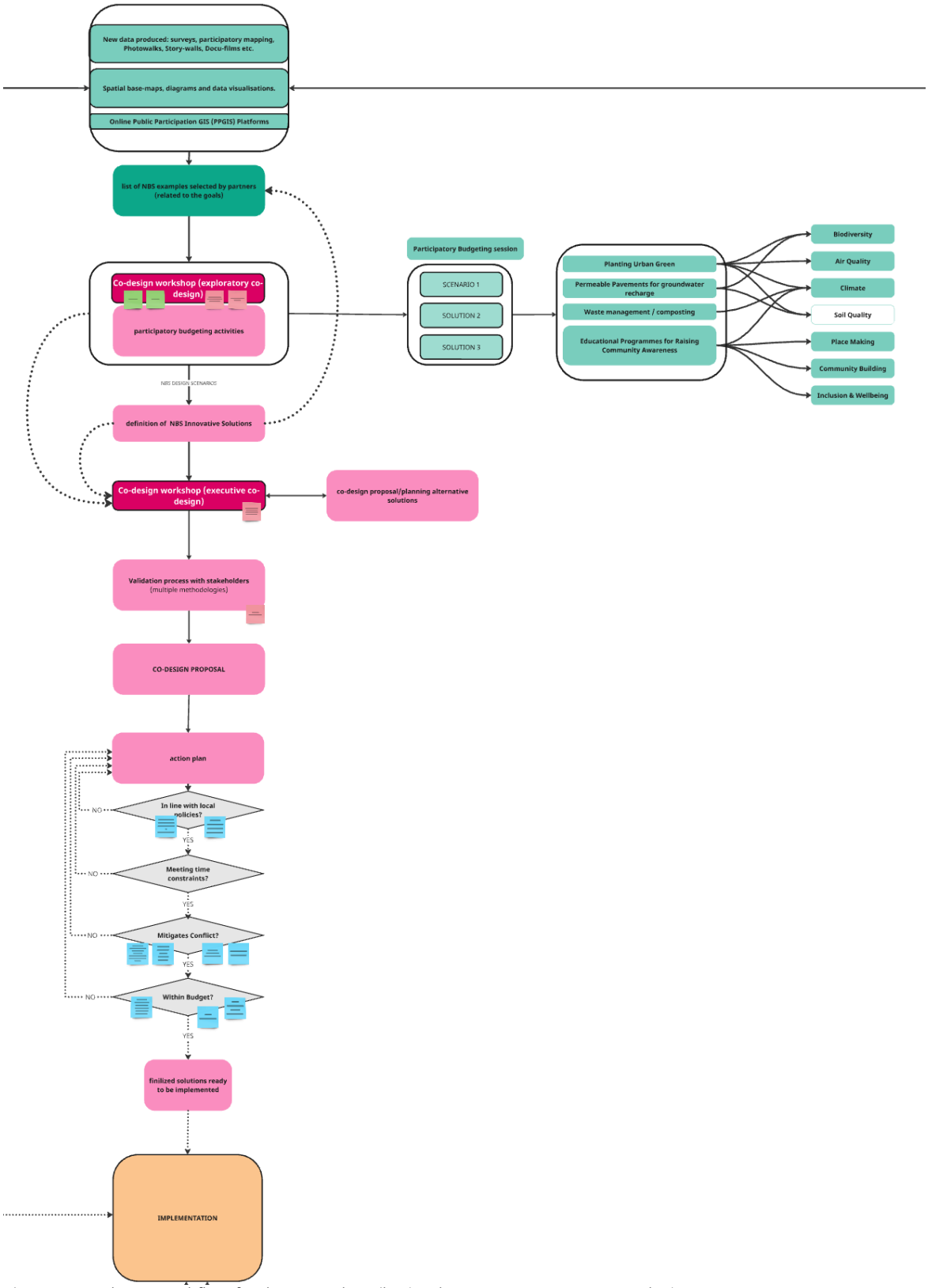

Figure 5: Roadmap Workflow for the Strovolos Pilot (Authors: C. Spanos, G. Artopoulos)

Implementation Plan Gantt Chart

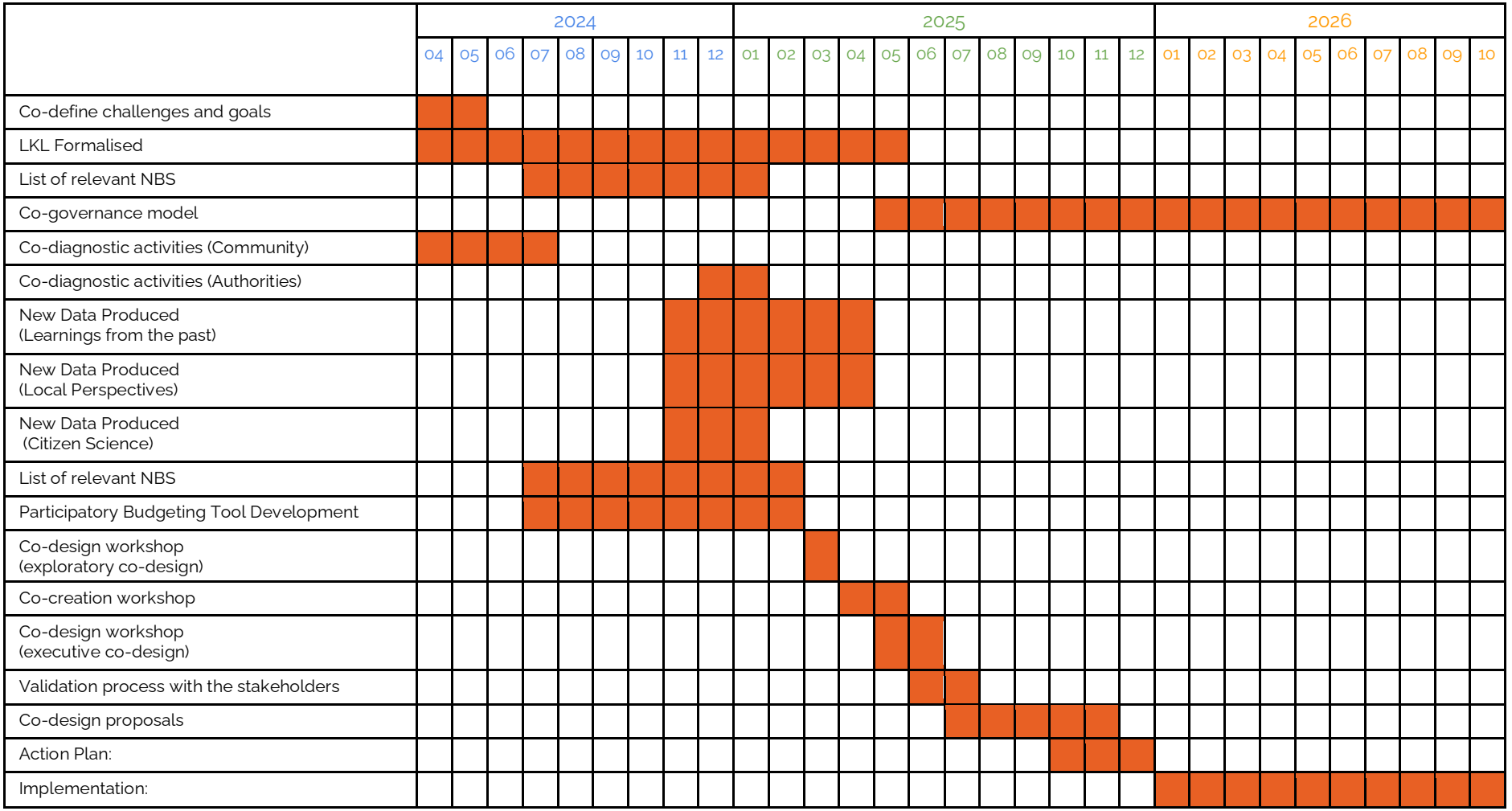

Table 6: Gantt Chart for Strovolos Implementation Plan. (Authors: C. Spanos, G. Artopoulos)

Annex 3: Estarreja Implementation Plan

Brief description of the pilot: Estarreja hosts a diverse territory, with rich and sometimes unique natural values, mostly (but not strictly) located in the lowlands of the council, close to the Aveiro Lagoon. This territory is also important for several activities such as farming, livestock, forestry, tourism, hunting and fishing, among others, that often have different views for its management. These different interests are sometimes conflicting, and biodiversity conservation is often disregarded. Our pilot case intends to create a space for dialogue and knowledge sharing, in order to enable the co-creation of solutions to value and promote the natural patrimony of Estarreja, in a process that includes its main stakeholders. We aim to conciliate the different views and opinions present within the council, looking to build a more sustainable and resilient development for the council, ensuring the protection of its natural ecosystems. To do this, Living Knowledge Labs (LKLs) will be established in each parish/town within the council, aiming to co-create solutions to be implemented both at local and council levels. Simultaneously, a similar (although simpler) process will be developed in schools, in a process originated by collaborative work with teachers.

Co-define challenges and goals:
Description of the step: Challenges and goals of the pilot case were identified and defined in a first phase through collaborative work by the Municipality's internal team (technicians, head of division and councillor). In a second phase, relevant feedback and inputs from key stakeholders were included, resulting in the initial proposal for Estarreja's Pilot Case: the BioRia Natural Park. In a third phase, and based on the expertise of the CES team and joint work between CME and CES, the project's main goals were adjusted in order to enable a true co-creation process for the pilot case. The new main goal is now defined as the co-creation of solutions to value and promote Estarreja's natural patrimony.
Issues, challenges, roadblocks: The new and broader focus and objectives of the pilot case may become a challenge to properly and effectively communicate to stakeholders. Goals may be perceived by some stakeholders as conflicting with specific interests present in the territory (e.g. hunting, farming). The main roadblock created by the change in the pilot case goals is the new need for external services that will become responsible for the mediation and facilitation of the participatory sessions, as the municipality team will take part in these also as a stakeholder. This issue was surpassed, but delayed the formalisation of the LKLs and the start of co-diagnostic activities.
Results, outputs, outcomes (expected or achieved): The most relevant outcome in the process of co-defining challenges and goals was the re-direction of the pilot case. Taking a step back and letting go of the initial goal of classifying a local-scope Natural Park will allow participants to truly be a part of the creation of the solutions to be implemented in the territory. We expect to improve the engagement and sense of belonging of the participants.
Risk Mitigation: A bigger effort and attention will be given towards the communication of the pilot case, so that its goals and constraints are clearly understood, and some pre-conceptions may be overcomed.
The stakeholders to be involved in the LKLs were not called to take part in the definition of pilot case goals. Nevertheless, we intend to have different communication strategies for different stakeholders, especially for their engagement and mobilization. The different LKLs may also need specific adjustments on communication.
Stakeholders involved or to be involved in this step: The co-definition of pilot case goals included an internal team, the Institute for the Conservation of Nature and Forests (in a consultative way), and CES researchers. For the school LKLs, the two Clusters of Schools present in the council are involved.
Additional Comments: nothing to add.
Are there any tools or methods the pilot is using in this step? No specific methods or tools were used in this step, only discussions and collaborative work.
Timeline (expected or achieved): The co-definition of goals is already finished. The specific goals for school LKLs are also already defined, as a result of a co-creation process with teachers. The

framework initially created for the 11th grade students is currently being adapted and should be finished in November.

List of relevant NBS:
Description of the step: Some relevant examples are the co-creation sessions for the development of the Estarreja's Municipal Plan for the Adaptation to Climate Change (https://www.cm-estarreja.pt/Energia_altera%C3%A7%C3%B5es_clim%C3%A1ticas), in which different stakeholders participated; the initiative "Plantar o Futuro" [Planting the Future] (https://agoraaveiro.org/en/plantarofuturo), promoted by the social/environmental NGO "Agora Aveiro" in partnership with the University of Aveiro and the Municipality of Estarreja, focused on restoring local natural ecosystems through the plantation of autochthonous trees; and the session promoted by a MSc student to evaluate the potential implementation of the Micro-Reserve of "Vale do Rio Cabrão" in Canelas (Estarreja). There are also some interesting cultural projects that act as inspiration, as well as activities from the Assessment Case (BioRia) and others promoted by the municipality or local NGOs.
At a national level, there are a few relevant projects focused on the classification of protected areas based on participatory approaches. These may share some insights and lessons learned regarding public participation in nature conservation.
Issues, challenges, roadblocks: The general lack of participatory culture in the council is one of the biggest challenges, as well as the common distrust regarding participatory approaches and its effectiveness, and the disinterest in nature conservation topics. All of these may affect engagement and mobilisation, and thus require stronger efforts.
Results, outputs, outcomes (expected or achieved): The local NbS examples activities highlight that some citizens and stakeholders show interest and care about local natural values. Furthermore, these projects, together with past environmental activities developed in the council, established some previous collaborations that may ease the engagement and mobilisation of said actors for the pilot case. National examples can share successful methods, help to avoid pitfalls, and act as a general inspiration for the possible council-wide solutions.
Risk Mitigation: N/A.
Stakeholders involved or to be involved in this step: To the moment, no stakeholders were involved in the identification of relevant NbS, except for the municipal team including technicians, heads of division, councillors and mayor interviewed under the scope of T4.2. During LKLs, involved stakeholders may provide new insights about other NbS relevant for the pilot case.
Additional Comments:
Are there any tools or methods the pilot is using in this step? Relevant NbS were identified only through research, collaborative work and partnerships established in the past, and through direct interviews under T4.2.
Timeline (expected or achieved): Identification of relevant NbS is a continuous process, as new examples may arise on LKLs, both on the co-diagnosis and co-design phases, Interviews for T4.2 were carried out in December 2023 and January 2024.

Co-diagnostic activities:
Description of the step: Co-diagnostic activities will take place between november 2024 and january 2025, in decentralized sessions developed in 6 parishes/towns belonging to the Estarreja council. (As a pilot case promoted by a municipality, one could have chosen to develop every session in Estarreja, the "headquarters" of the council. Instead, one chose to establish LKLs in each of the parishes/towns of the council, thus "decentralizing"/"centralising" the process.) Although specific methods are still being refined, sessions will include a walkthrough, light lunch, and a workshop. In addition to these, an institutional and centralized session will also take place, with the relevant entities that have competences in territory management, research and development. Lastly, co-diagnostic activities will also take place in schools, at least with two classes from the 11th grade, and one from the 8th. One or two more classes may be added in the near future.
Issues, challenges, roadblocks: Co-diagnostic activities were delayed by a series of roadblocks, caused mostly by bureaucratic issues. Firstly, since the municipality's technicians will be participating in the sessions in representation of a stakeholder, external facilitation and mediation services were needed. In order to do so, and being this a sensitive process regarding personal data, new contents had to be prepared prior to opening up a public acquisition process, related to the

GDPR. Furthermore, this public acquisition process has its own legal timings and bureaucratic requirements and is time-consuming, delaying the ideal starting time for the pilot case and LKLs formalization. Regarding schools, the foreseen change in teaching staff from 2023-24 to 2024-25 school years, and later the beginning of the school year, delayed the collaborative work, starting only in october.
Results, outputs, outcomes (expected or achieved): We expect to have as an important outcome maps for each parish/town of places and natural values indicated by stakeholders, that are important to protect, manage, promote or restore. Another important outcome is the identification of challenges and opportunities both at local and council-wide levels. Hopefully we will also achieve the creation of a place for discussion and exchange, in which nature-related challenges in the council can be approached and that may enforce human-nature relationship. This place will be located in the parishes' own buildings, or alternatively in other sites close and accessible to local communities.
Risk Mitigation: not available yet
Stakeholders involved or to be involved in this step: Municipal technicians, landowners, farmers, citizens, livestock producers, foresters, hunters, fishermen, NGO's, researchers, local industry and businesses, firefighters, teachers and students.
Additional Comments:
Are there any tools or methods the pilot is using in this step? Community mapping, walkthroughs, focus groups.
Timeline (expected or achieved): From November 2024 to February 2025

LKL Formalized:
Description of the step: LKLs are not formalised yet. We intend to formalise LKLs in 6 different locations within the council: Canelas e Fermelã, Salreu, Beduído, Veiros, Pardilhó and Avanca, that will work independently, but providing and receiving inputs to and from others. Besides these, a LKL will be established in Estarreja, to gather contributions from entities with legal competences in territory management. LKLs will be established also in schools, in collaboration with teachers, and with guaranteed involvement of two classes from the 11th grade and one from 8th.
Issues, challenges, roadblocks: Adequate engagement and mobilisation are relevant challenges to face in the immediate future. The institutional LKL will host entities with competences for providing legal assessments for some of the solutions that may be co-created, so possible conflicts of interests are an issue. A major issue related to the chosen strategy is how to link and exchange information between different LKLs.
Results, outputs, outcomes (expected or achieved): We expect to host the LKLs in the parish headquarters, a place close or well-known to the majority of stakeholders. We expect the dynamics to be quite different amongst LKLs.
Risk Mitigation: Communication will again be key to tackle engagement and mobilisation challenges, and different strategies will be used, from outdoor and digital campaigns to direct invitation and media use. Since some practical actions in the field will surely require permits/authorization from regulatory entities, the same ones that we intend to involve in the process, we believe that, to avoid conflicts of interests, these entities should only take part in the co-diagnostic, but stay aside from the early co-design stage. Afterwards they may provide technical inputs on the co-designed solutions, and be a part of implementation and monitoring.
Stakeholders involved or to be involved in this step: Municipal technicians, landowners, farmers, citizens, livestock producers, foresters, hunters, fishermen, NGO's, researchers, local industry and businesses, firefighters, teachers and students, entities with competences in territory management.
Additional Comments:
Are there any tools or methods the pilot is using in this step?
Timeline (expected or achieved): From November 2024 to February 2025

Co-governance model:
Description of the step: This will be defined at a later stage, and may include the municipality, local NGOs, citizens, among other stakeholders. Different co-governance models may appear in the different LKLs (different parishes/towns).
Issues, challenges, roadblocks: The lack of participatory culture in the council may be a significant roadblock.

Results, outputs, outcomes (expected or achieved): The governance models are impossible to predict at this moment.
Risk Mitigation: Not available yet
Stakeholders involved or to be involved in this step: All of the stakeholder categories involved in the co-diagnostic activities may be a part of co-governance models.
Additional Comments:
Are there any tools or methods the pilot is using in this step?
Timeline (expected or achieved): From November 2024 to February 2025

New Data produced:
Description of the step: During co-diagnosis activities, we expect to co-create community maps for each town/parish, natural values distribution, priority areas to intervene (within or outside the scope of TRANS-lighthouses), and historic/cultural information regarding specific sites in the council. Similar data to be gathered also in schools.
Issues, challenges, roadblocks: One challenge is the large and diverse territory.
Results, outputs, outcomes (expected or achieved): For each parish/town within the council, we expect to obtain community maps (related to nature), maps with natural values distribution, georeferenced sites with historic/cultural relevance and sites of priority intervention. Similar types of outputs are expected to be obtained in the co-diagnostic activities developed in schools.
Risk Mitigation: Not available yet
Stakeholders involved or to be involved in this step: All stakeholders involved in the co-diagnostic stage.
Additional Comments:
Are there any tools or methods the pilot is using in this step? Methods used for data production include community mapping (cultural and/or affective mapping), focus groups and walkthroughs. Tools may include, among others, GIS software and possibly serious geogame developed under TRL.
Timeline (expected or achieved): Data should be produced between January and February 2025.

Co-design workshop (exploratory co-design):
Description of the step: Co-design activities will be built upon the work developed during the decentralised and centralised co-diagnostic activities. The number of sessions will be co-defined. Exploratory co-design may be focused on the prioritisation of sites/areas to implement solutions, and on the first approaches to NbS that may be co-created. Exploratory co-design in schools will be done in the classroom, with groups of 4 to 5 students, that will each select a site and co-create an NbS. These will be analysed by a municipal team to evaluate feasibility, and voted in the classroom to elect one NbS per class.
Issues, challenges, roadblocks: Management of expectations is essential in this phase (as well as in the remaining pilot case), as solutions have to comply with local and national regulations, be within budget, and be feasible. Challenges in schools include the need for a close follow-up and a thorough analysis of each NbS proposed by groups by municipal technicians, which may be time consuming.
Results, outputs, outcomes (expected or achieved): Selection of sites for the implementation of NbS. Exploratory ideas/suggestions/approaches for NbSs to be implemented.
Risk Mitigation: Designed solutions will have to be technically analysed, in order to ensure their legality and feasibility.
Stakeholders involved or to be involved in this step: All stakeholders involved in the co-diagnostic stage, except entities with competences for providing official opinions regarding NbS implementation (to avoid conflicts of interest).
Additional Comments:
Are there any tools or methods the pilot is using in this step? Methods to be used may include cultural/affective mapping, focus groups, world cafe, design thinking, NbS cards, among others. Methods and tools will be selected after co-diagnostic stage, and some may even vary among different LKLs
Timeline (expected or achieved): February to May 2025

Co-design workshop (executive co-design):

Description of the step: Co-design workshops are not yet defined, and will be discussed in every LKL. Exploratory and executive co-design may be approached in separate moments or simultaneously, depending on what is discussed with participants. Executive co-design is expected to focus on designing NbSs for the sites selected on the exploratory co-design. The main goal of this stage is to build NbS based on a common vision of the involved stakeholders.
In schools, each class will work on the previously selected NbS, with support from teachers and municipal technicians.
Issues, challenges, roadblocks: Management of expectations is essential in this phase (as well as in the remaining pilot case), as solutions have to comply with local and national regulations, be within budget, and be feasible.
Results, outputs, outcomes (expected or achieved): We expect to achieve design plans for a small-scale NbS for each parish/town, one for each class involved, and a plan/strategy for a council-scope project regarding the promotion or conservation of Estarreja's natural values.
Risk Mitigation: Not available yet
Stakeholders involved or to be involved in this step: All stakeholders involved in the previous stage.
Additional Comments:
Are there any tools or methods the pilot is using in this step?
Timeline (expected or achieved): February to May 2025

Definition of NBS Innovative solutions:
Description of the step: Two different solutions will be designed in each LKL: a local one, focused on the respective parish/town, and a municipal one, focused on the entire territory of the council. These will also be built upon the work developed by the institutions on the centralised co-diagnostic session. The presence of different categories of stakeholders is expected to play an important role in providing the innovative trait to the co-designed NBSs.
Issues, challenges, roadblocks: The sharing of knowledge, outcomes and results between different LKLs will be a challenge, as they will be working on a council-wide solution in separate sessions
Results, outputs, outcomes (expected or achieved): Not available yet
Risk Mitigation: Not available yet
Stakeholders involved or to be involved in this step: All stakeholders involved in the previous stage.
Additional Comments:
Are there any tools or methods the pilot is using in this step?
Timeline (expected or achieved): February to May 2025

Co-design proposals:
Description of the step: During co-design workshops, proposals for NbS will be worked on and proposed to the group. The specific steps will be co-defined during the exploratory co-design activities.
In schools, each class will be divided in groups of 4 to 5 students, which will work on their NbS proposal. A constant follow-up from teachers and municipal technicians will ensure they are feasible and within the scope of the project. All group proposals will be presented to the class, so that they can be analysed and voted.
Issues, challenges, roadblocks: All proposals have to be analysed by municipal technicians, which may become time consuming.
Results, outputs, outcomes (expected or achieved): Several proposals for NbS will be obtained. which is not only a result on its own, but will also allow the identification of the areas of interest and NbS types that are valuable to the youth target-group.
Risk Mitigation: The participation of municipal technicians as representatives of this stakeholder will ensure the feasibility of the proposals discussed, as they must comply with national law and be within the competences of the municipality.
Stakeholders involved or to be involved in this step: All stakeholders involved in the previous stage.
Additional Comments:

Are there any tools or methods the pilot is using in this step? Methods and tools are yet to be defined, but will probably involve focus groups, design thinking, NbS cards, serious geogame, among others, and will be supported by community maps, GIS, etc.
Timeline (expected or achieved): February to May 2025

NBS Solutions:
Description of the step: Different types of solutions can be proposed and designed in the local-scope LKLs and school-LKLs, as long as they stay within the scope of the pilot case, and comply with local and national laws and frameworks. For the council-scope solution, only a framework/strategy will be designed, to direct the future actions of the Municipality regarding nature conservation.
Issues, challenges, roadblocks: Issues, challenges and roadblocks will be specific to the NbS design, and are therefore difficult to identify at this stage.
Results, outputs, outcomes (expected or achieved): Some examples of NbS that may be proposed or implemented include the creation of areas for biodiversity conservation, leisure/sporting areas linked with natural values, implementation of visitable areas, trails or educational equipment, restoration of degraded areas, among others. For the council-scope solutions, possible frameworks to be proposed are the classification of local protected areas, frameworks for sustainable practices, strategy for stakeholder capacitation, networks of private reserves, collaborations between entities, among others.
Risk Mitigation: Not available yet
Stakeholders involved or to be involved in this step: All stakeholders involved in the previous stages.
Additional Comments:
Are there any tools or methods the pilot is using in this step?
Timeline (expected or achieved): April to May 2025

Validation process with the stakeholders:
Description of the step: Validation of proposed NbS will be done by municipal technicians, that will ensure their legality and feasibility, and that it stays within the scope of the pilot, avoiding greenwashing. If possible, this validation should start during LKL sessions, in open discussions on the proposed solutions.
In schools, a continuous monitoring and validation of the co-created solutions will be ensured both by teachers and municipal technicians, in order to ensure proposals are legal and feasible, and to correctly manage expectations. After validation, NbS selection will be made through voting, in a strategy to be co-defined with teachers, and that should allow voting rights also for teachers and municipalities.
Issues, challenges, roadblocks: Validation of solutions may not be linear in some cases, due to the specificities of the territory or solutions proposed.
Results, outputs, outcomes (expected or achieved): Not available yet
Risk Mitigation: Validation of solutions must be impartial and transparent, in order to avoid mistrust.
Stakeholders involved or to be involved in this step: The municipality plays an important role in this step, although discussions on validation should include all of the stakeholders present in the LKLs.
Additional Comments:
Are there any tools or methods the pilot is using in this step?
Timeline (expected or achieved): April to May 2025

Participatory budgeting activities:
Description of the step: Participatory budgeting activities will be promoted in each LKL, as well as in each class. The details and overall strategy will be co-defined as the pilot progresses.
Issues, challenges, roadblocks: As 6 LKLs will be implemented, targeted budgeting activities have to be developed. A consequence of this approach is the reduction of individual budgets, which can be seen as an issue and challenge.
Results, outputs, outcomes (expected or achieved): Selection of an NbS for implementation in each LKL, and in each classroom.
Risk Mitigation: Not available yet

Stakeholders involved or to be involved in this step: All stakeholders involved in the previous stage.
Additional Comments:
Are there any tools or methods the pilot is using in this step?
Timeline (expected or achieved): April to May 2025

Action Plan:
Description of the step: After NbSs are proposed, validated and selected, the action plan for co-implementation will be defined in each LKL, both for local and school LKLs. For the council-scope solution, necessary concepts, documents, scientific contents, regulations, among others, will have to be prepared, and may have contributions from different stakeholders.
Issues, challenges, roadblocks: Not available yet, as they are dependent on selected NbS.
Results, outputs, outcomes (expected or achieved): Budgets for goods and services, implementation plans, maps, multi-disciplinary scientific data, regulations, designs, among others. Results and outputs will be directly linked to the NbS selected.
Risk Mitigation: Not available yet
Stakeholders involved or to be involved in this step: All stakeholders involved in the previous stages.
Additional Comments:
Are there any tools or methods the pilot is using in this step?
Timeline (expected or achieved): May to June 2025

Finalized solution ready to be implemented:
Description of the step: After the co-creation of the action plan, NbSs are ready to implement. Scheduling implementation must be done according to the typology of NbS, its specificities, and the tasks and actions it will involve. Some might start being implemented immediately after the action plan is developed, others may have to be delayed in order to start at the optimal time of the year (e.g. plantations should not be done in the hot summer months), or to wait for the production of equipment and materials.
Issues, challenges, roadblocks: Although NbS might be ready to be implemented, scheduling might be delayed in order to respect timings from public and legal procedures, respect Natural cycles, equipment production/acquisition, etc. This will depend on the specific actions that will be carried out, and in some LKLs implementation may start sooner than in others.
Results, outputs, outcomes (expected or achieved): Not available yet
Risk Mitigation: Managing expectations will be important in this stage, as all stakeholders must be aware of the possible issues and challenges to face ahead, and what the timings for implementation will be.
Stakeholders involved or to be involved in this step: All stakeholders involved in the previous stages.
Additional Comments:
Are there any tools or methods the pilot is using in this step?
Timeline (expected or achieved): May to June 2025

Implementation:
Description of the step: Implementation will strongly differ amongst LKLs, as each local-scope solution adopted will have its own specificities. For the council-scope solution, as it will be designed as a strategy, based on frameworks, guidelines, regulations and/or collaborations, its implementation may start immediately after all previous stages are finalised. For school-based LKLs, the implementation should ideally be done until the end of the school-year, in order to maximise student engagement and involvement, and for them to have some outcomes of their work.
Issues, challenges, roadblocks: As there are municipal elections in October 2025, internal processes (including financial ones) may halt. Implementation should already be underway, to avoid roadblocks and delays.
Results, outputs, outcomes (expected or achieved): The main and highly anticipated outcome will be the framework/plan for nature conservation in the council, obtained through a co-creation process, as the council-scope solution. This will include the vision of the different stakeholders in

the territory, and the participation of actors from all of the council. The framework/tools created will guide the future work of the municipality, and be included as one of its main environmental goals.
We also expect to include different stakeholders and stakeholder categories in the implementation of the local-scope NbSs, promoting nature and human-nature relationship in each parish/town from Estarreja. Lastly, we expect to implement NbSs created by students, which might provide new spaces for biodiversity, for education, or for leisure and sports in nature in the council, or design new projects or tools to communicate and promote local natural values.
Risk Mitigation: As there are municipal elections in October 2025, internal processes (including financial ones) may halt. Implementation should already be underway, to avoid roadblocks and delays.
Stakeholders involved or to be involved in this step: Ideally, all stakeholders involved in the previous stages should be somehow involved in the implementation stage.
Additional Comments:
Are there any tools or methods the pilot is using in this step?
Timeline (expected or achieved): From May 2025 onwards, depending on NbS details.

Roadmap Workflow

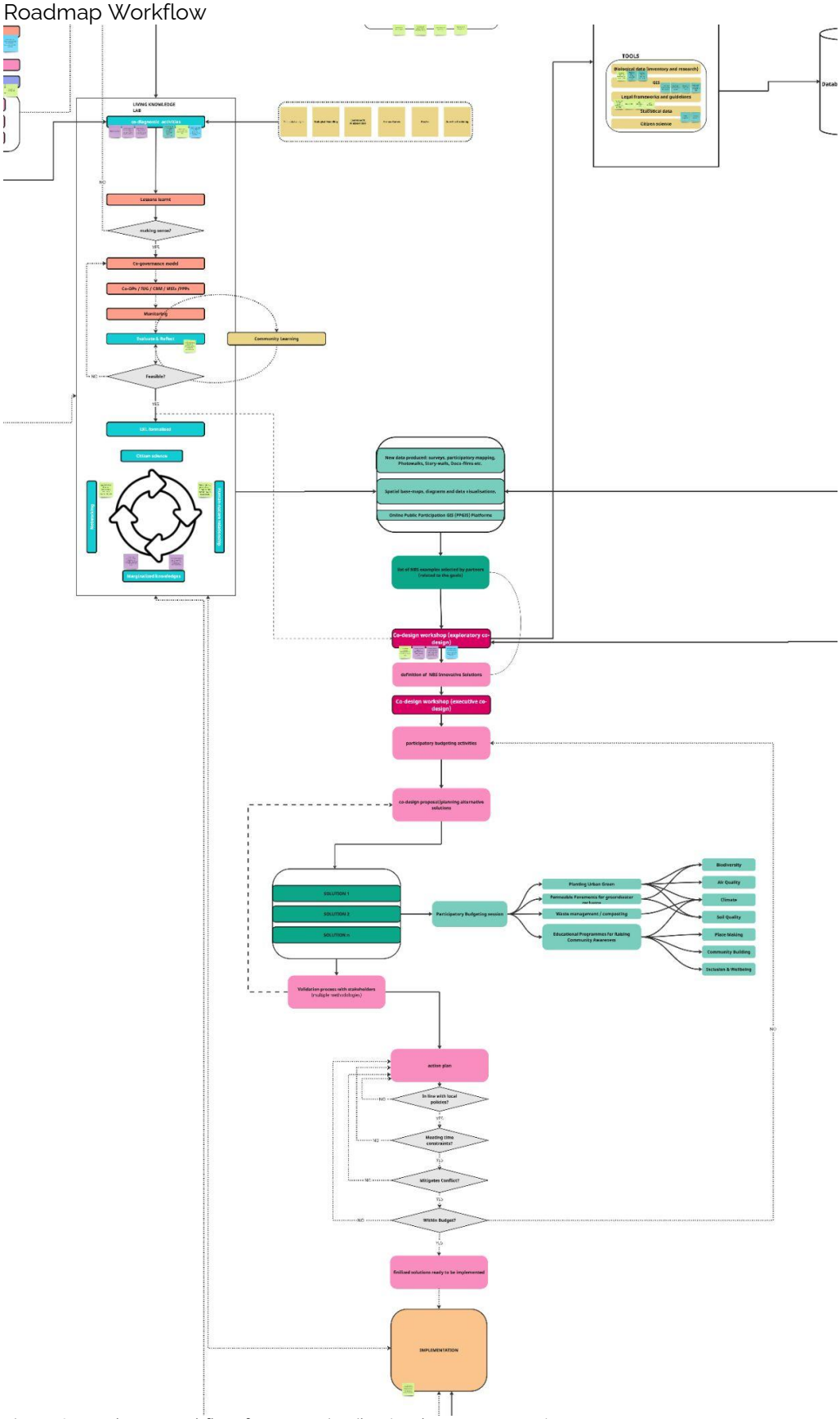

Figure 6: Roadmap Workflow for Estarreja Pilot. (Author: S. Marques)

Implementation Plan Gantt Chart

	2024									2025												2026									
	04	05	06	07	08	09	10	11	12	01	02	03	04	05	06	07	08	09	10	11	12	01	02	03	04	05	06	07	08	09	10
Co-define challenges and goals	■	■	■	■			■	■																							
List of relevant NBS	■	■																													
Co-diagnostic activities								■	■	■	■																				
Co-design activities											■	■	■	■																	
NBS Proposal and validation													■	■	■																
Participatory Budgeting													■	■	■																
Action Plan														■	■	■															
Implementation														■	■	■	■	■	■	■	■	■	■	■	■	■					
School based activities (co-diagnosis to implementation)								■	■	■	■	■	■	■	■																

Table7: Gantt Chart for Estarreja Implementation Plan. (Author: E. Mendes)

Annex 4: Barcelos Implementation Plan

Brief description of the pilot: The Barcelos municipality's pilot project is entitled 'Playground is Nature' and will be implemented in three schools in different parishes in the municipality of Barcelos. The António Fogaça school, a school center that covers pre-school and 1st cycle; the Abel Varzim Basic School 2,3, with 2nd and 3rd cycle students; and the Vila Cova Basic and Secondary School, with students from 1st to 12th grade.
The main aim of the 'Playground is Nature' pilot project is to: Co-create playground spaces through Nature-Based Solutions (NBS), involving those who use them (students, teachers and operational assistants) and a participatory process for selecting a proposal based on the students' ideas.

Co-define challenges and goals:
Description of the step: Together with our extended team, made up of municipal technicians and coordinating teachers from the pilot schools, the following challenges and objectives were identified: Promote intergenerational interaction and integration as a tool for preserving and enhancing the ecological and cultural heritage of school playgrounds. Promote the appropriation of nature-based systems for human recreation. Promoting leadership among young people and the educational community. Promoting the environmental resilience of local communities in adapting to climate change. Promoting creative leisure among students, the ability to play freely and in contact with nature, autonomy in recreational relationships with sustainable playgrounds.
Issues, challenges, roadblocks: How to stimulate the participation of the critical mass, environmental awareness and NBS implementation to the educational community.
How can we integrate the participation/co-creation process of this pilot with the Municipal Climate Action Plan (participation process). How can we promote the transmission of ancestral knowledge of free play and youth leadership National regulations and legislation on school equipment/structures and playgrounds (what are we allowed to implement) - occupational, health and safety, and other issues. Participation of different levels and ages of students
Results, outputs, outcomes (expected or achieved): The result was the engagement of the teachers from the pilot schools and the definition of a plan to achieve the proposed objectives. We also realized that there is a greater desire to promote contact with nature and to sensitize young people to climate change.
Risk Mitigation: Propose that students representing the pilot schools be included in the extended team. Involvement of a health and safety representative in the extended team. Awareness-raising workshops on the themes of the pilot project: NbS and climate change, participatory budgeting and participatory methods, and free play, risk and nature.
Stakeholders involved or to be involved in this step: Coordinating teachers/headmasters from the pilot schools.
Additional Comments:
Are there any tools or methods the pilot is using in this step?Awareness-raising workshops
Timeline (expected or achieved): april 2024

List of relevant NBS:
Description of the step: Our case study, the Barcelos Secondary School Arboretum, is our main inspiration for the NbS to be implemented in the school playgrounds of our pilot schools.
Together with the extended team, we are trying to draw up a list of national projects that can inspire and guide us. We are going to start working together with consultants who have been involved in playground renaturalization projects, so that they can support us with their know-how on this topic.
Issues, challenges, roadblocks: The main challenges we have identified are related to the maintenance costs of these spaces and also the lack of legislation to implement more natural spaces in public schools.
Results, outputs, outcomes (expected or achieved): The fact that the arboretum has existed since 1986 is undoubtedly very important in demonstrating how school playgrounds can be natural and involve students in their maintenance and in learning situations.
Risk Mitigation: Involvement of a health and safety representative in the wider team to help us address the lack of legislation. Involvement of consultants who have participated in playground re-naturalization projects.

Stakeholders involved or to be involved in this step: Coordinating teachers/headmasters from the pilot schools and from the assessment case school.
Additional Comments:
Are there any tools or methods the pilot is using in this step? Desk research
Timeline (expected or achieved): august 2024

Co-diagnostic activities:
Description of the step: Interviews were held with school headmasters in order to survey the situation of playgrounds in Barcelos schools, and also to understand the relationship with nature and the will to change. Link to the documents: https://docs.google.com/document/d/10MrBDvcQRIS_eF70NHHtJWa5YYeWLANv/edit?usp=drive_link&ouid=116125050575237926107&rtpof=true&sd=true
and
https://docs.google.com/document/d/1R59rh9rsq5ljwWZ29NSr650sJQ0Mvopz/edit?usp=drive_link&ouid=116125050575237926107&rtpof=true&sd=true

Issues, challenges, roadblocks: Very urbanized school playgrounds, with few opportunities for opportunities for contact with nature and few for creative play. Playgrounds that are too protective, with few opportunities to experience the risks and challenges of free play to play freely in natural or less artificial environments.
Results, outputs, outcomes (expected or achieved): There is greater awareness of the benefits of contact with nature and the need to do something about climate change.
Risk Mitigation: Organize sessions for parents on the importance of free play, contact with nature and risk.
Stakeholders involved or to be involved in this step: Coordinating teachers/headmasters from the pilot schools and from the assessment case school.

Additional Comments:
Are there any tools or methods the pilot is using in this step? Interviews
Timeline (expected or achieved): February 2025.

Co-governance model:
Description of the step: Our co-governance model involves the Municipality of Barcelos, the three selected pilot schools with their entire teaching community, students and staff. We also intend to involve parents' associations, local authorities, youth associations/groups and cultural and environmental associations.
We have created an extended team which at the moment is made up of technicians from the municipality, teachers coordinating the pilot project in each of the pilot schools and a representative from the health and school safety area. We intend to expand this team to include student representatives from each pilot school and someone who is a voice for nature (a person with great expertise on Nature and NBS)..
Issues, challenges, roadblocks: We detected some concerns about the students' involvement in the extended team. They fear that the students are too immature to discuss certain issues.
One of our pilot schools only has students up to the age of 10.
Results, outputs, outcomes (expected or achieved): The inclusion of different elements in this team brings many benefits as there is a greater diversity of ideas and knowledge that is proving to be very useful for the development of the project.
Risk Mitigation: Involving students in the extended team so that they have a greater understanding of the issues and decisions relating to the project and thus create greater engagement and a sense of responsibility.
Stakeholders involved or to be involved in this step: Coordinating teachers/headmasters from the pilot schools and from the assessment case school.
Additional Comments:
Are there any tools or methods the pilot is using in this step?
Timeline (expected or achieved): June 2025

LKL Formalized:

Description of the step: Three awareness-raising workshops were held in the pilot schools on NbS and Climate Change, Participatory Methods and Participatory Budgeting and also on Play, Risk and Nature. Our LKL is under constant construction and involves various players in the school community
Issues, challenges, roadblocks: Through these workshops it was realised that nature-based solutions are unknown to the vast majority of the school community. And that there is some apprehension regarding parents' attitudes towards free play, contact with nature and challenge. A number of questions relating to participatory budgeting were also raised, which gave rise to some concern. Some of these questions were:
'How will the money be distributed to each school?'
'If there is money left over, how will it be used?'
'Who will be able to vote on the projects?'
'How many votes should each voter be entitled to?'

Results, outputs, outcomes (expected or achieved): The results were stimulating in the sense that realized how enthusiastic the project was, that the teachers from the schools involved were motivated and committed to learning more about the topics related to the project and taking the project forward.
Risk Mitigation: To answer the questions and challenges raised, we planned:
A 50-hour training course to train teachers in NbS and other topics such as participatory budgeting and the importance of playing in nature with some associated risk.
We also plan sessions for parents to address the issue of risk and free play in more natural spaces.
As for the issues raised about participatory budgeting, they were resolved in the extended team and we reached a consensus among everyone.
Stakeholders involved or to be involved in this step: Coordinating teachers/ teachers and staff from the pilot schools / project support consultants
Additional Comments:
Are there any tools or methods the pilot is using in this step?A 50-hour training course to train teachers in NbS and other topics such as participatory budgeting and the importance of playing in nature with some associated risk.
Timeline (expected or achieved): october 2026

New Data produced:
Description of the step: We intend to produce data on how to involve and promote leadership among young people and the educational community. And also how to change the current situation of school playgrounds in our schools towards more natural playgrounds, more conducive to students playing more freely and in contact with challenges and nature. How to unlearn everything that has been built over the last three decades, in which school playgrounds have become more artificial, with plastic equipment, without nature, with artificial grass or tarmac floor.
Issues, challenges, roadblocks: Not available yet
Results, outputs, outcomes (expected or achieved): Not available yet
Risk Mitigation: Not available yet
Stakeholders involved or to be involved in this step: Coordinating teachers/ teachers and staff from the pilot schools / project support consultants / students / parents
Additional Comments:
Are there any tools or methods the pilot is using in this step?
Timeline (expected or achieved): october 2026

Co-design workshop (exploratory co-design):
Description of the step: In the awareness-raising workshops held with the teachers and staff of the pilot schools, some exploratory work has already begun on proposals for NbS in school playgrounds.
Issues, challenges, roadblocks: One of the most frequently asked questions was how to bring the knowledge of NbS to the students so that they could come up with viable ideas.
Results, outputs, outcomes (expected or achieved): Very creative NbS ideas that could be implemented came up, showing motivation and interest in the project, and also that the workshops helped to increase knowledge of what NbS are and their benefits.

Risk Mitigation: We implemented a 50-hour training programme to better train teachers on the project's themes so that they are better prepared to support students when developing ideas and projects.
Stakeholders involved or to be involved in this step: Coordinating teachers/ teachers and staff from the pilot schools / project support consultants
Additional Comments:
Are there any tools or methods the pilot is using in this step?awareness-raising workshops
Timeline (expected or achieved): march 2024 - june 2024

Definition of NBS Innovative solutions:
Description of the step: Starting next year (2025), the students at the pilot schools, together with their teachers, will propose NbS ideas to implement in the playground. Students will have access to a portfolio of NbS ideas implemented in school playgrounds. However, it is expected and encouraged that the proposed NbS have innovative elements and solutions.
Issues, challenges, roadblocks: Not available yet
Results, outputs, outcomes (expected or achieved): Not available yet
Risk Mitigation: Not available yet
Stakeholders involved or to be involved in this step: N/A
Additional Comments:
Are there any tools or methods the pilot is using in this step? NBS Cards
Timeline (expected or achieved): january 2025 - march 2025

Co-design workshop (executive co-design):
Description of the step: Teachers at the pilot schools have already started working with students so that they can develop and propose NbS ideas for implementation in their schools' playgrounds. Especially in Citizenship and Development classes, teachers are already providing knowledge about the project, what NbS are and the relationship with climate change. A workshop entitled "The World Outside" was developed, in which students are invited to connect with nature in a creative and educational way; several activities outside the classroom are also being planned, including field trips, and, take students to experience/analyse the project linked to Nature already implemented at the headquarters of the Barcelos School Group - the "Arboreto", our case study.
Issues, challenges, roadblocks: Not available yet
Results, outputs, outcomes (expected or achieved): Not available yet
Risk Mitigation: Not available yet
Stakeholders involved or to be involved in this step: Coordinating teachers/ teachers and staff from the pilot schools / Coordinator teachers from the assessment case "Arboretum"
Additional Comments:
Are there any tools or methods the pilot is using in this step? Inaturalist /BoardGame about NbS / The world outside workshop
Timeline (expected or achieved): october 2024 - april 2025

Participatory budgeting activities:
Description of the step: Together with the wider project team, we have already drawn up the charter of principles that will guide the implementation of participatory budgeting, reaching a consensus. The implementation of participatory budgeting will take place in April.
Issues, challenges, roadblocks: We had some challenges since there are three schools with students from different years. Defining who votes, who can submit proposals for the budget, how they will be selected and validated. And also if there is any money left over, how will it be distributed? To another school? To another project?
Results, outputs, outcomes (expected or achieved): In discussion with the extended team, through clear communication or if necessary a vote, we reached a consensus to define all the points of the charter of principles of participatory budgeting, which would meet the expectations of each pilot school.
Risk Mitigation: Not available yet
Stakeholders involved or to be involved in this step: Coordinators teachers / teachers / students
Additional Comments:

Are there any tools or methods the pilot is using in this step? Design of NbS proposals for playgrounds by students. Voting on the projects by the school community.
Timeline (expected or achieved): July 2024 - April 2025

Co-design proposals:
Description of the step: The co-design of the proposals developed by the students will take place during the work carried out in classes with the teachers involved in the pilot project.
Issues, challenges, roadblocks: Not available yet
Results, outputs, outcomes (expected or achieved): Not available yet
Risk Mitigation: Not available yet
Stakeholders involved or to be involved in this step: Coordinators teachers / teachers / students /project support consultants
Additional Comments:
Are there any tools or methods the pilot is using in this step?
Timeline (expected or achieved): October 2024 - January 2025

NBS Solutions:
Description of the step: The proposals submitted must fall within the area of playground with the implementation of Nature-based Solutions, involving the following two Thematic Areas in complementarity:
1 - Sustainability
2 - Education
Issues, challenges, roadblocks: Not available yet
Results, outputs, outcomes (expected or achieved): Not available yet
Risk Mitigation: Not available yet
Stakeholders involved or to be involved in this step:N/A
Additional Comments:
Are there any tools or methods the pilot is using in this step?
Timeline (expected or achieved): N/A

Validation process with the stakeholders:
Description of the step: Validation of the proposed NbS will be carried out by a team of municipal technicians from different areas, in order to guarantee their viability. Meetings will be held with the proposers (students and teachers) in order to adjust the proposals if they prove unfeasible at any point.
Issues, challenges, roadblocks: Not available yet
Results, outputs, outcomes (expected or achieved): Not available yet
Risk Mitigation: Not available yet
Stakeholders involved or to be involved in this step:
Additional Comments:
Are there any tools or methods the pilot is using in this step?
Timeline (expected or achieved): Please fill this section

Action Plan:
Description of the step: We defined our action plan in the charter of principles that guides the implementation of participatory budgeting. This action plan may change, as it is a collaborative plan that is open to suggestions.
Issues, challenges, roadblocks: complying with the timeline can be challenging
Results, outputs, outcomes (expected or achieved): a great engagement of all the actors involved
Risk Mitigation: the action plan is collaborative and available for adjustment
Stakeholders involved or to be involved in this step: Coordinators teachers / teachers / students / health and hygiene officer / parents
Additional Comments:
Are there any tools or methods the pilot is using in this step?
Timeline (expected or achieved):
- Training and information sessions: October/November/December 2024
- Receipt of proposals: 1 December 2024 to 14 February 2025

- Technical appraisal of the proposals, with the bidders, by Barcelos City Council and partners: 15 to 28 February 2025
- Final project presentation session: 1 to 15 March
- Voting on the projects in all schools/groups: 16 March to 31 March 2025
- Submission of results: April 2025
- Public announcement and presentation of the winning projects to the community: 01 to 16 May 2025
- Budget implementation of winning projects: May to December 2025
- Public inauguration of projects: June to December 2025

Finalised solution ready to be implemented:
Description of the step: After the projects have been put to the vote through participatory budgeting, the winners will be publicly announced. Together with the municipality's technical team, we will proceed with the implementation of the winning projects and award the contract for the work.
Issues, challenges, roadblocks: Not available yet
Results, outputs, outcomes (expected or achieved): Not available yet
Risk Mitigation: Not available yet
Stakeholders involved or to be involved in this step: N/A
Additional Comments:
Are there any tools or methods the pilot is using in this step?
Timeline (expected or achieved): may 2025

Implementation:
Description of the step: The contracted suppliers will carry out the implementation of the winning projects.
Issues, challenges, roadblocks: Not available yet
Results, outputs, outcomes (expected or achieved): Not available yet
Risk Mitigation: Not available yet
Stakeholders involved or to be involved in this step: Suppliers / Coordinators teachers
Additional Comments:
Are there any tools or methods the pilot is using in this step?
Timeline (expected or achieved): May to December 2025

Roadmap Workflow

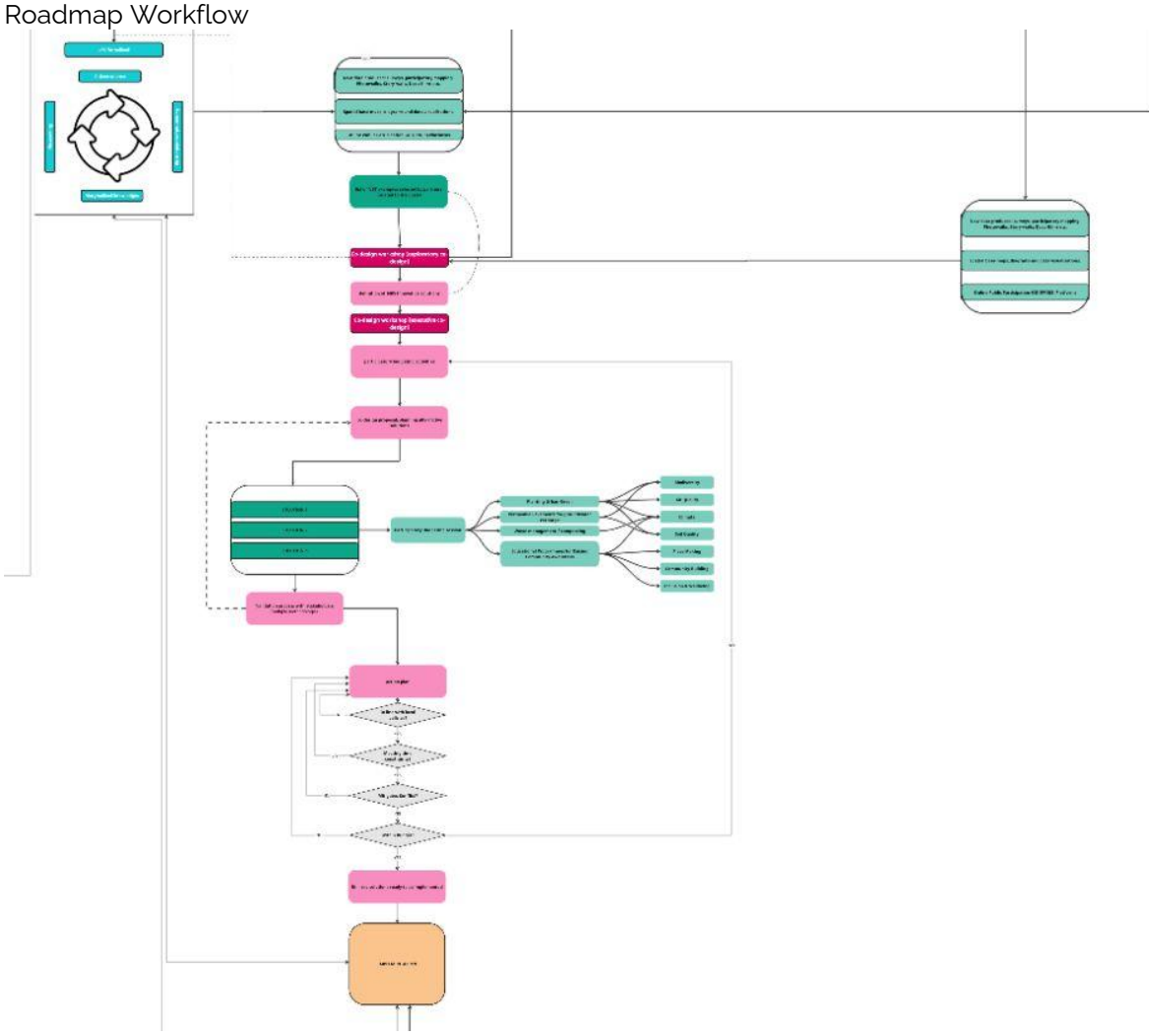

Figure 7: Roadmap Workflow for Barcelos Pilot (Author: A. Coelho)

Gantt chart of the Implementation Plan

	2024									2025												2026									
	04	05	06	07	08	09	10	11	12	01	02	03	04	05	06	07	08	09	10	11	12	01	02	03	04	05	06	07	08	09	10
Co-define challenges and goals																															
List of relevant NBS																															
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Co-governance model																															
LKL Formalized																															
New Data produced																															
Co-design workshop (exploratory co–design)																															
Participatory Budgeting activities																															
Co-design workshop (executive co-design)																															
Co-design proposal																															

Table 8: Gantt Chart for Barcelos Implementation Plan. (Author: A. Coelho

Annex 5: Rome Implementation Plan

Brief description of the pilot: The pilot project in Rome concerns the implementation of a 'green classroom' as a type of NBS within an urban oasis. This 'open-air room' in a public space can have multiple uses. A green classroom refers to an outdoor or environmentally conscious learning space that integrates sustainable design principles and natural elements to foster both education and ecological awareness. The concept of a green classroom often emphasizes experiential learning, environmental stewardship, and the use of eco-friendly materials and technologies. It can take the form of either an open-air classroom in natural settings or a traditional classroom that follows sustainable architectural practices. The idea of a green classroom emphasizes environmental science, sustainability, wellbeing, and conservation. Teaching opportunities might include topics such as renewable energy, recycling, climate change, and ecosystems. This education helps to foster environmental responsibility among students. A green classroom can also simply be a public space where citizens can gather for collective outdoor activities such as yoga or tai-chi classes, or other encounters of various kinds. The concept of the green classroom is broad and encompasses various scales, typologies, and methods. The pilot project in Rome will explore two potential approaches and interpretations of the green classroom: one in the San Lorenzo neighborhood, a densely populated area just outside the historic Roman walls and near Sapienza University, and the other within the campus of Sapienza University itself. The San Lorenzo site will focus on the possibility of incorporating a green classroom into a vacant lot to be developed, which will be transformed into a green public space for the neighborhood. The second intervention will explore the integration of a green classroom within an existing garden on the university campus. Both locations contain archaeological remains, adding complexity to the project in terms of implementation, as well as offering an opportunity to examine the relationship between Nature-Based Solutions (NBS) and historical heritage—a particularly relevant issue in the context of Rome.

Co-define challenges and goals + List of relevant NBS:
Description of the step: The goals defined for the Roman pilot consist in the exploration of the possibilities of the green classrooms as a device to achieve a more sustainable and inclusive public space in the II Municipality. The conversation with the II Municipality has been lengthy and included several meetings between the DIAP (Department of Architecture and Project of Sapienza University) and the elective representatives of the II Municipality. These series of meetings and discussions brought to the agreement between the II Municipality and DIAP about the design of the whole area of Via De Lollis, which has been a successful result as it expands the original scope of the project to only co-design the green classroom.
Conversations happened also between different experts within Sapienza (as the Prof. Fabiola Fratini, who develops and promotes collaborative activities with the aim of experimenting with tools and processes for sustainable regeneration, declining the 'green infrastructure' model adapted to the neighbourhood dimension through nature-based solutions, and of implementing awareness-raising, scientific and educational activities inspired by the principles of citizen participation with schools (Istituto Comprensivo San Cleto, Istituto Comprensivo Tiburtina Antica), associations (Zappata Romana, UNRRA CASAS, San Lorenzo neighbourhood committee, GRU, HabiCura, San Lorenzo Legambiente and citizens.) and with the artist/engineer AndreCo (Dr. Andrea Conte who for Earth Day designed a green classroom as a Climate Action Project and Land Art, a nature-based solution and a socialising space open to all). The Green Classroom, so called, is a form of innovation in green design from an environmental, social and artistic point of view. The artist and scientist Andreco, together with citizens, environmentalists and researchers, created in the Aniene Natural Reserve in Rome, a Land Artwork that is also a social area of free access, after a long participatory process that involved scientific researchers, activists and citizens of all ages, through workshops, performances and debates.) to help defining the ultimate scope of the project within TRL: the exploration of the possibilities of the green classrooms with different stakeholders (especially the children of different schools and students of Sapienza, the citizens of S. Lorenzo neighbourhood) and the definition of two different prototypes of green classrooms, one in a vacant lot belonging to the II Municipality that needs to be transformed in a urban public space (Via De Lollis area) and the other within the campus of Sapienza (via Scarpa area).

As references for the project, it was selected the Assessment case of Piazza Rossini in Bologna as it exemplifies the temporary transformation with low budget and low impact solutions of an urban public space with NBS solutions. Additionally, the list of NBS includes the methodology of co-creation of green classrooms investigated by the artist and environmental engineer Andrea Conte (AndreCo).
Issues, challenges, roadblocks: The two areas have different conditions and characteristics, but they both include the challenge of being archeological sites and being therefore under the attention of the superintendent to the archeology of Rome (via De Lollis) and the superintendency of the Vatican State for the catacombs in the area of Via Scarpa. An additional issue arose for the area in via De Lollis as there is no direct access to water for irrigation on site and this isa design issue to be solved.
These issues represent specificities and peculiarities of this area that can add themes and complexity to the exploration we collectively carry out in TRL.
Results, outputs, outcomes (achieved): The agreement between the II Municipality and the DIAP for the design of the area of via De Lollis, and the conversations with the Rectress of Sapienza to transform the university's spaces into pedestrian areas, but also into teaching spaces to raise awareness of NBS among students, academics and technical and administrative staff are important results of this preliminary steps that allow for the development of different typologies of green classrooms and a greater involvement of the DIAP in the transformation of the urban area of San Lorenzo which situates the co-design of the green classrooms for the TRL project within a larger and more organic development of the area.
A list of criticalities for the development of NBS that in the project includes :
Archaeological Risk Mitigation: To address the issues related to the presence of archeological sites in the areas, several meetings were scheduled with the superintendencies during the winter and fall 2024. Collaborative co-design meetings with technicians (architects, archaeologists, experts of the areas involved) are being developed to define common goals and constraints to be met, which are indispensable before we can start with co-design actions open to citizens, students and various stakeholders.
Water supply: A meeting to explore the possibilities of intervention in a water deprived area has been held with Prof. Marchetti, an expert in agroforestry within the DIAP.
Stakeholders involved in this step: the main stakeholders involved in this step of the project are the DIAP, Sapienza Governance, the II Municipality and the superintendencies responsible for the different areas, Fondazione Innovazione Urbana of Bologna for the Assessment Case of Piazza Rossini
Additional Comments:
Are there any tools or methods the pilot is using in this step? Mainly conversational meetings between the stakeholders, as a method to explore the different goals and objectives of all the stakeholders involved.
For the study of relevant NBS, desk research, study of relevant cases and conversation with experts
Timeline: from October 2023 to October 2024 for the co-definition of challenges and goals, from October 2023 to March 2024 for the list of relevant NBS

Co-diagnostic activities:
Description of the step: Preliminary co-diagnostic activities have been set up in the two parallel streams of collaborations, one between the DIAP and the II Municipality, to highlight the conditions of the area in via De Lollis, the other between the DIAP and the Sapienza Rector Office to explore the conditions of the area in via Scarpa. A second set of co-diagnostic activities will be organized with the school Saffi Borsi (elementary and secondary school) for the area in Via Scarpa and with Sapienza students and PhD students of Architecture for the area in via De Lollis. Those activities will consists in walkthroughs, mental maps (i.e. Kevin Lynch methodology, Andreco Fratini), focus groups on the context of the area and the connection to NBS.
Issues, challenges, roadblocks: The activities have to be tuned according to the level of expertise and capacities of the participants.
Results, outputs, outcomes (expected and achieved): Information about the contextual characteristics of the two areas have already been unearthed through desk and field research, the co-diagnostic activities with the youth will hopefully reveal new perspectives on the areas and their features. To address the co-design phase on NBS with children and Sapienza students two experts

in participatory methods will be included, Prof. Fratini for the activities with the children and AndreCo for the activities with students of Sapienza.
Stakeholders involved or to be involved in this step: First phase: Superintendency, DIAP and II Municipality. Second phase: citizens, schoolchildren and Sapienza Students
Additional Comments:
Are there any tools or methods the pilot is using in this step? walkthrough, mental mapping, ppt presentations
Timeline (expected and achieved): first phase from October 2023 to October 2024; second phase with students March/April 2025

Co-governance model:
Description of the step: With regard to the development of the NBS 'green classroom' model, two different processes are being followed, depending on whether it is a green infrastructure to be inserted in an existing garden (via Scarpa) or in a garden being planned. In the first case the co-governance model implies the initiation of the participatory process with the involvement of the schools in defining the objectives. In the second case instead (via De Lollis) a preliminary phase of identification of the constraints to be respected with the superintendence and input from the 2nd Municipality for the design of the green oasis as a whole is preliminary to the start of the participatory process for the implementation of the green classroom.
Issues, challenges, roadblocks: The biggest issues reside in the different timeline that exists between the municipality, the approval from the part of the superintendency and the co-creation process with the local stakeholders. In an ideal sequence it would be interesting to start from a bottom up co-creation process, Instead the II Municipality has deadlines connected to the budget assignments from Roma Capitale that are very urgent (by the end of December) which don't allow to set up previously the co-creation process with the youth (involvement of the local schools, involvement and commitment by the students). We will therefore do a parallel job, on the one hand we will start the dialogue with the superintendency to try to understand the constraints, and on the other we will make an outline project of the entire urban oasis-public garden that will allow the municipality to ask Roma Capitale to allocate the necessary budget. In the meantime, we will start dialogues with citizens and youth to set up a process of co-creation of the green classroom.
Results, outputs, outcomes (expected or achieved): The result is hopefully a model of "green classroom" that can be replicated for other transformations of public space elsewhere.
Risk Mitigation: addressing The fact of starting parallel consultations with the superintendency and the municipality in order to see the requirements of governance met, and at the same time the work of citizen and student participation, we think may be a significant attempt to minimise the risks of failure in the green classroom implementation
Stakeholders involved or to be involved in this step: Heritage Superintendency, II Municipality, DIAP, Students
Additional Comments:
Are there any tools or methods the pilot is using in this step? N/A
Timeline: from May 2023 to October 2026

LKL Formalized:
Description of the step: The Living Knowledge Lab is under construction, and it will be formalized in the next steps of the process when the main co-creation activities will take place. Currently, the LKL consists of institutional stakeholders (already involved in the process): DIAP, Heritage Superintendency, II Municipality, Sapienza Office Rectress and local stakeholders: School Borsi Saffi, PhD Students, Sapienza Students.
Issues, challenges, roadblocks: Each of the stakeholders, both at local and institutional level have different agendas and different timelines of action.
Results, outputs, outcomes (expected or achieved): the formalization of the LKL will allow one to have a solid understanding of the conditions and needs of each stakeholder and to extract knowledge about the project.
Risk Mitigation: the coordination of DIAP in the LKL group is fundamental to smooth the operations and to share information among stakeholders. DIAP has a pivotal role in leading the co-creation process.

Stakeholders involved or to be involved in this step: institutional stakeholders: DIAP, Heritage Superintendency, II Municipality, Sapienza Office Rectress and local stakeholders: School Borsi Saffi, PhD Students, Sapienza Students Organizations.
Additional Comments:
Are there any tools or methods the pilot is using in this step? different communication methods will be used with each stakeholder.
Timeline (expected or achieved): from October 2023 to March 2025

Co-design workshop (exploratory co-design):
Description of the step: The co-design workshop will be divided into two different and parallel streams: on the one hand there will be PhD students and Sapienza students led by AndreCo to explore possibilities of design for the green classroom to be built in the new green area in via De Lollis. On the other hand, children from the Borsi Saffi School will be led by Prof. Fabiola Fratini in the exploration of the intervention for a green classroom in the existing green area in via Scarpa.
Issues, challenges, roadblocks: the issues are related to the different ways in which the two workshops have to be addressed as they need different tools and methodologies for the different stakeholders.
Results, outputs, outcomes (expected): a set of initial ideas on the typologies of green classrooms, their objectives and goals and the way they could be implemented.
Risk Mitigation: Artist AndreCo is expert in the methodology of co-designing green classrooms with young adults whereas Prof. Fratini has expertise in the collaboration with children in the co-design of NBS
Stakeholders involved or to be involved in this step: PhD students, Sapienza Students, Elementary and intermediate school students and teachers, DIAP for coordination
Additional Comments:
Are there any tools or methods the pilot is using in this step? For the children it will possibly be used cards as examples about NBS (similar to the one used in URBINAT) to inspire and have them playing with them to create solutions. For the PhD Students, a co-design workshop will take place with the traditional architectural workshop system having them exploring the possibilities of design for a green classroom. Andreco will instead work on raising awareness of climate change and other environmental sustainability issues more suitable for university students
Timeline: March/April 2025

New Data produced:
Description of the step: the exploratory workshops will gather information about the areas through exploratory walkthroughs and mapping activities of the students, moreover they will provide an array of different ideas about the possible development of the concept of the green classrooms, distinct between green classrooms to be built in a newly designed urban space (as the one in via De Lollis) or ideas on how to implement a green classroom in an already existing green space such as the one in via Scarpa
Issues, challenges, roadblocks: the new data might provide unexpected insights about the areas and issues about the development of NBS
Results, outputs, outcomes (expected): a set of new data about the existing contextual characteristics of the two areas and an array of ideas about the two kinds of classrooms
Risk Mitigation: N/A
Stakeholders involved or to be involved in this step: Children, PhD and Sapienza Students, DIAP for coordination
Additional Comments:
Are there any tools or methods the pilot is using in this step? walkthrough, collaborative mapping, autocad and 3D tools
Timeline (expected): March/April 2025

Definition of NBS Innovative solutions:
Description of the step: the exploratory co-design workshop will focus on the definition of NBS that are innovative for the two area's conditions and that are applicable for the specific contexts. In

addition a preliminary research on "green classroom" examples will be implemented by the TRL research group that will be illustrated in the LKL.
Issues, challenges, roadblocks: N/A
Results, outputs, outcomes (expected): List of tentative ideas for the development of two typologies of green classrooms in the two different contexts
Risk Mitigation: N/A
Stakeholders involved or to be involved in this step: Children, PhD and Sapienza Students, DIAP for coordination
Additional Comments:
Are there any tools or methods the pilot is using in this step? N/A
Timeline (expected): March/April 2025

Co-design workshop (executive co-design)+ Co-design proposals + NBS solutions::
Description of the step: The second section of the co-design workshop, the executive co-design phase, concerns only the PhD students and the students of Sapienza as they have the correct expertise to actually co-design a green classrooms addressing all the challenges that the area brings (i.e. archaeology, water scarcity, existing trees and vegetation, earth level changes etc
The results of the co-design exploratory workshop and the co-design executive workshops will be further developed to arrive at a final design stage by the DIAP to be presented to the two institutions (Sapienza for via Scarpa and II Municipality for via De Lollis). The design proposal will include the NBS solutions developed in the previous steps
Issues, challenges, roadblocks: An issue will be to align with the timing of the building construction of via De Lollis, the scheduling of the construction phase for the II Municipality is still unclear to us and therefore the whole process so described is subject to redefinition according to the schedule decided by the public works at II Municipality level.
Results, outputs, outcomes (expected): Passing from the schematic design of the exploratory workshop to the development design/final design for the areas. Final design to be presented to institutional partners.
Risk Mitigation: The misalignment in timing will be adjusted by including a certain amount of flexibility in the scheduling of our activities
Stakeholders involved or to be involved in this step: PhD students, DIAP, Sapienza, II Municipality
Additional Comments:
Are there any tools or methods the pilot is using in this step? 3d softwares/autocad, co-design workshop activities, precedents of activities conducted by Fabiola Fratini and Andrea Conte
Timeline (expected): April 2025- June 2025

Participatory budgeting activities:
Description of the step: The participatory budgeting activities are not yet defined but they will probably rely on the serious geo-game designed and developed by CyI or will adjust the same methodology to our condition
Issues, challenges, roadblocks: most of the budget existing for the project (for via De Lollis) will be dedicated to the technical issues of implementation of the area (ground works, infrastructures, etc) and it is still hard at this moment to understand what budget will be allocated to NBS solutions part.
Results, outputs, outcomes (expected or achieved): having an understanding of the NBS that might result in the best sustainable results compared to their economical impact.
Risk Mitigation: In the development of the masterplan for the area that will be submitted to the II Municipality by the end of November there will be preliminary information about the amount of budget that might be dedicated to NBS for the De Lollis area
Stakeholders involved or to be involved in this step: II Municipality, DIAP, Heritage superintendency, Roma Capitale, Office of the Rectrice
Additional Comments:
Are there any tools or methods the pilot is using in this step?probably the Serious geo-game developed by CyI or a similar tool
Timeline (expected): initial budgeting allocation November 2024, Participatory activities April 2024

Validation process with the stakeholders:

Description of the step: The design proposals will be presented to the whole community of stakeholders for validation, this will happen in distinct activities, a final presentation for the students of the School Saffi Borsi, a final presentation for the work of the PhD students and two bilateral meetings with the institutions (one with Sapienza for via Scarpa, one with II Municipality for via De Lollis).
Issues, challenges, roadblocks: if any particular opposition is presented by any of the stakeholders regarding the design proposals, additional time will be required to adjust the final design accordingly.
Results, outputs, outcomes (expected): feedback by the stakeholders on the final design
Risk Mitigation: A time for possible additional design finetuning has to be included in the process, to prevent that the feedback arrives only at the final presentations, intermediate steps, especially with the institutions are required to present the development of the projects.
Stakeholders involved or to be involved in this step: DIAP, Sapienza, II Municipality, Heritage Superintendency
Additional Comments:
Are there any tools or methods the pilot is using in this step? focus group with the stakeholders to receive feedback
Timeline (expected): June/july 2025

Action Plan:
Description of the step: An action plan will be developed once the previous steps have been accomplished that will include:
Clearly defined objectives.
List all required tasks.
Set of achievable deadlines.
Assignment of responsibilities.
Identification of resources and support for each task.
The action plan will be developed for each green classrooms' implementation in the two areas.
The finalized solutions to be implemented will be directed to the two different areas, via Scarpa e Via De Lollis, and will include different solutions according to the two different themes and contexts of the areas. The two solutions will be two different declinations of the Green Classroom concept and will be the result of the co-design experience of young children and university students.
Issues, challenges, roadblocks: it is very hard at this moment to define a proper action plan since the projects are not yet defined and there is the variable of the construction site on via De Lollis to be taken into consideration in the definition of the timing. The action plan will be defined according to the variables of: budgeting allocation for the green classrooms in the two areas, timing of construction for via De Lollis, correct timing for planting in via Scarpa, procedures of approval from the Heritage Superintendency, procedures of approval from the II Municipality. The issues are mostly related to the different processes that will lead to the two solutions,
Results, outputs, outcomes (expected): the action plan will provide a correct timing for the second half of TRL until 2026 for the Roman pilot. Executive design and construction documents for the two green classrooms
Risk Mitigation: it will be pivotal to start formulating the different aspects of the action plan as soon as the information is available on the different aspects of the projects. The risks are associated with allocation of the budget for the whole garden from the part of the municipality, preliminary tests to check the presence of archaeology in the areas where trees are to be planted, timing of the construction phase of Via De Lollis, mainly, therefore it will be pivotal to keep a constant communication with the II Municipality and the Heritage Superintendency, that will be in charge of the construction and the protection of the area, to be aware of the best timing to include the green classroom project.
Stakeholders involved or to be involved in this step: DIAP, Sapienza, II Municipality; heritage Superintendency
Additional Comments:
Are there any tools or methods the pilot is using in this step? Meetings and focus groups will be used to formulate and assess the action plan
Timeline (expected): June/July 2025 to September 2025

Implementation:
Description of the step: The implementation will consist mainly of the construction and possibly co-construction of the two green classrooms in the two areas.
Issues, challenges, roadblocks: one challenge is defined by the lack of clarity about the timing of the construction of via De Lollis area, and therefore the impossibility of planning ahead when the intervention for the green classroom will take place. The second challenge concerns the possibility of co-construction activities, as there might be issues related to the insurance about who can enter and work, both for the area of Sapienza and for the area of the II Municipality
Results, outputs, outcomes (expected): the results of the implementation will be a series of events where the local stakeholders, especially the children and the students, will be included in the building of the two green classrooms. The outcomes will be the green classrooms themselves.
Risk Mitigation: It will be pivotal to break down the constructions of the two green classrooms in smaller activities (performing activities) that can include the youth and the students in the co-construction of some aspects of the green classrooms implementation, i.e. planting the trees or the shrubs, installing pieces of artworks related to the NBS etc.
Stakeholders involved or to be involved in this step: DIAP, II Municipality, Sapienza, Children, Students
Additional Comments:
Are there any tools or methods the pilot is using in this step? self-build: Self-building refers to the process in which an individual or a group actively participates in the creation of their built environment, either by doing the construction work themselves, directly managing the project, or working closely with hired contractors.
Timeline (expected): October 2025- October 2026

Roadmap Workflow

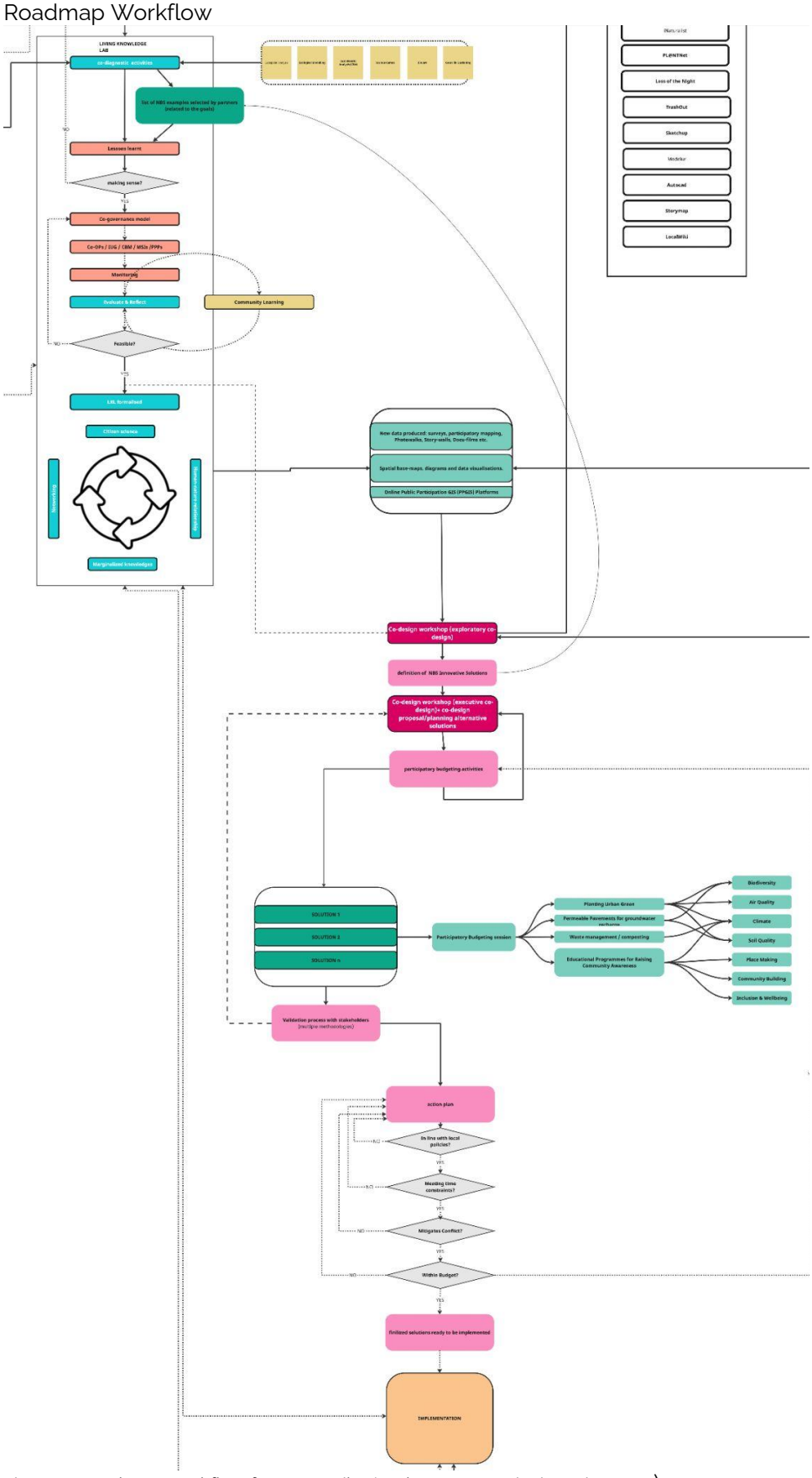


Figure 8: Roadmap Workflow for Rome Pilot (Authors: D. Ottaviani, B. Di Donato)

Gantt chart of the Implementation Plan

	2024									2025												2026									
	04	05	06	07	08	09	10	11	12	01	02	03	04	05	06	07	08	09	10	11	12	01	02	03	04	05	06	07	08	09	10
Co-define challenges and goals + List of NBS	■	■	■	■	■	■	■																								
Co-diagnostic activities	■	■	■	■	■	■	■																								
Co-governance model	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
LKL Formalized	■	■	■	■	■	■	■	■	■	■	■	■																			
Co-design workshop (exploratory co–design)												■	■																		
New Data Produced												■	■																		
Co-design workshop (executive co-design)													■	■	■	■														
Participatory Budgeting Activities							■						■																		
Validation process with stakeholders															■	■															
Action Plan															■	■															
Finalized NBS solutions to be implemented																			■												
Implementation																			■	■	■	■	■	■	■	■	■	■	■	■	■

Table 9: Gantt Chart for Rome Implementation Plan. (Author: D. Ottaviani, B. Di Donato)

Annex 6: Roskilde Implementation Plan

Brief description of the pilot: The key aim of the pilot is to establish a Living Knowledge Lab for Regenerative Knowledge and Practice. Within the Danish context of industrialized agriculture we perceive regenerative farming as a framework for societally marginalized knowledge and practices, and the reemergence of these as potentials for transforming human-nature relations. Facing the climate- and biodiversity crisis with this pilot we want to meet the call for a paradigm shift in farming practices- and policies from industrial towards agroecological farming. This implies a change in perceptions and practices from technological mastery over nature towards farming as reciprocally being embedded in living ecologies. Working with concrete actors in such transformation is ambivalent, conflictual and contradictory. In the pilot we will work with the re-emergence of marginalized knowledge and practices, and how regenerative farmers marginalized in the Danish context of industrialized farming, can learn from each other, inspire future farming practices, in order to scale out regenerative practices. Accordingly, in this pilot we find that it is key to learn from small-scale farmers lived experience with reciprocal nature relations in farming practices; to approach living knowledges and practices coherently across social, ecological and economic dimensions; develop and mature concepts and frameworks for generative production and lifestyles; to support regenerative practitioners and continuously develop practices and knowledges; and to identify barriers and strategies to overcome these in broader societal transformations of agricultural practices. The formalization of the Living Knowledge Lab started with consolidating a collaboration with the Regenerative Farming Association. Several meetings were held with RUC researchers and the representatives of the association, where common interests and possible nodes of collaboration were explored. Eventually, a Pilot Coordination Group was formed that consisted of two RUC researchers and a representative of the association.
As the next step of the formalization, it was decided to organize a workshop to 1. Present the TRANS-Lighthouses project to the members of the Regenerative Farming Association and other regenerative farmers-practitioners, interested in the collaboration 2. Ensure visibility and engagement of the members 3. Co-create ideas for further development of the pilot plan, based on needs and interests of the practitioners. The workshop was held in January 2024 with participation of approximately 30 members of the association.
The next step was to, based on the ideas generated in the workshop, in the Pilot Coordination Group, to advance the co-development of the plan for activities and actors engagement. The current stage is formalization of working groups by involvement of association members who are working with topics of community supported agriculture and biodiversity.

Co-define challenges and goals:
Description of the step: The aims of the pilot were co-identified through discussions in the 1.)Coordination group of the pilot (RUC and Regenerative Association),
The Coordination Group has been established consisting of RUC researchers (Jonas Egmose and Anya Umantseva as post.doc lead researcher) and a representative from the Regenerative farming Association (Maria Andersen) to develop, coordinate, implement, evaluate and report on activities. The Pilot Coordination Group had a number of regular meetings.
2) as well as in the Future Creation Workshop with 30 farmers;
To initiate the collaboration a workshop was held for the association hosted by Roskilde University to identify challenges, visions and potential action points relevant for the association in furthering regenerative practices. The workshop was organized with the overall theme *'Regenerative Agriculture 2024: What have we learned - where are we going?'* with a total of 27 participants. The workshop was structured in three phases: First, a critique phase with the aim of identifying the problems we face in regenerative agriculture. Next, a utopia phase with the aim of developing visions for where regenerative agriculture should go towards 2030, followed by a realization phase, where it was discussed how to follow up and act on the many ideas. The ideas and themes generated in the workshop served as the basis for co-developing a plan of action for the project; and were also presented to the association to inform and support their activities. The report of the workshop can be provided upon request.

Key aims for the pilot (It should be noted that the aims are in continuous re-negotiation and adaptation):
The LKL will have the following three key aims for the pilot phase:
1) To establish an ongoing Living Knowledge Lab between Roskilde University and the Danish Regenerative Farming Association as a platform for continuous collaboration on regenerative practices and knowledges.
2) To strengthen and mature the regenerative knowledge base, by conducting action research and practice development on to key dimensions:
a. How human-nature relations are approached through regenerative practices, and how these differ from industrialized farming.
b. How socio-economic organization and community economy (CSA) can provide better conditions for regenerative practices and lifestyles.
3) To strengthen the organization and development of regenerative practices by:
a. Establishing networks of farmer-to-farmer knowledge-exchange for the distribution and learning from best-practices and collective capacity building of dealing with challenges faced by regenerative farmers.
b. To develop and mature a model for decentralized small-scale regenerative farming practices which can further be disseminated and used for scaling out regenerative farming practices, and to setup, develop and test a prototype of collaborative governance in local areas across farmers, municipalities, rural communities and relevant actors for coordination and implementation of regenerative farming practices and lifestyles.
This implies co-disseminating results of the pilot within and beyond the association targeted transformation towards regenerative practices in Denmark.

Issues, challenges, roadblocks: The main challenge that we are encountering is the precarious and semi-informal structure of the regenerative farming association, and the precariousness of the farmers themselves. The association is the main partner of the pilot, and is chosen because they represent marginalized groups in the area of Danish agriculture. However, they are a bottom-up organization, with a very flat structure, working mostly on a voluntary basis, hence it can be difficult to achieve strong commitment in leading activities. Because of this challenge, the pilot plan has to be continuously re-negotiated, adjusted and adapted to the possibilities of the association.

Results, outputs, outcomes: A pilot plan has been developed and agreed upon within the coordination group. The pilot plans, and hence, the objectives and goals are in a continuous process of re-negotiation and adaptation.

The following stages are planned in the pilot plan:

Phase 1: Mapping phase identification of challenges, visions and action points for pilot plan co-creation Activities in this phase: Future Creation workshop Establishment of the coordination group between RUC and the Regenerative Farming Association A number of meetings within the coordination groups to establish objectives and possible activities of the pilot Participatory culture mapping Mapping of the context of regenerative farming in Denmark	**Spring 2024**

Phase 2: Organizational setup and anchoring with the association, and two (or three) working groups, and setup of working-group for municipal governance. Activities in this phase: Meetings in the coordination group to determine the organizational set up of the collaboration A number of activities (meetings) to establish the working groups (CSA working group and biodiversity working group) Upcoming activities: planning of the municipal actors group	**Spring -autumn 2024**
Phase 3: Action research and knowledge co-creation on human-nature relations and socio-economic organization of small-scale regenerative farming and lifestyles. Áctivities in this phase: Data collection, including a online survey on community-supported agriculture (CSA) models in Denmark; in-depth, semi-structured interviews with regenerative farmers Collaboration with the CSA group to receive their inputs on the knowledge needs	**Autumn 2024-Spring 2026**
Phase 4: Establishing (virtual) **farmer to farmer knowledge exchange** networks and seminars (This phase is still to be confirmed, it might be taken out of the plan)	**Spring 2025-Autumn 2026**
Phase 5: Co-creating and maturing models for **cross-municipal collaborative governance** on regenerative farming. The objective is to gather a task force of representatives from several Danish municipalities that include regenerative farming as a part of their climate strategies. The objective of this collaboration is to co-develop cross-municipal strategies for supporting and scaling small-scale regenerative farming, building on opportunities formulated in DK2020 (the framework that supports Danish municipalities in developing climate plans (DK2020 A model for multi-level cooperation.pdf) and Grøn Trepart (a framework for a collaborative process to support the sustainable transition of Danish agri-food sector). Detailed plan: *1. Workshop with relevant municipal actors (tentatively March-April 2025)* A workshop that brings together interested municipal actors. The goal is to identify existing barriers and opportunities for scaling small-scale	**Spring 2025-Spring 2026**

regenerative farming practices and discuss the role of municipalities in facilitating this transition. Participants municipalities, RUC, members of the Association *2. Co-Developing a Conceptual Framework for Municipal Governance on advancing Out Small-Scale Regenerative Farming (February-October 2025)* Building on insights from the workshop, the second phase will focus on co-developing a conceptual framework to outline the roles of different actors in supporting small-scale regenerative farming, the necessary policy tools, and how municipalities can implement strategies to scale these practices. *3. Cross-actor workshop on scaling out regenerative farming (Jan-March 2026)* This workshop will bring together municipal actors, policymakers, farmers, research institutions, and stakeholders to discuss strategies for advancing regenerative farming through cross-municipal collaborations.	
Phase 6: Co-dissemination of results for scaling- out, and ensuring **organizational anchoring** beyond project lifetime.	**Spring -autumn 2026**

Risk Mitigation: N/A
Stakeholders involved or to be involved in this step: RUC, the leaders of the regenerative farming association and farmers who are members of the association
Additional Comments:
Are there any tools or methods the pilot is using in this step? Future Creation workshop
Timeline (expected or achieved): N/A

List of relevant NBS
Description of the step: N/A
Issues, challenges, roadblocks:
Results, outputs, outcomes (expected or achieved):
Risk Mitigation: .
Stakeholders involved or to be involved in this step: N/A
Additional Comments:
Are there any tools or methods the pilot is using in this step?
Timeline (expected or achieved): N/A

Co-diagnostic activities:
Description of the step: Future Creation Workshop with approximately 30 farmers; Interviews with members of the association.
Issues, challenges, roadblocks:
Results, outputs, outcomes (expected or achieved):
Risk Mitigation:
Stakeholders involved or to be involved in this step: N/A
Additional Comments:
Are there any tools or methods the pilot is using in this step?
Timeline (expected or achieved): N/A

Co-governance model:
Description of the step: Model of collaborative co-governance on small-scale regenerative farming practice, consisting of Academia (RUC), regenerative farming practitioners (Regenerative farming association) and a number of municipalities. A Workshop with stakeholders relevant for municipal collaborative co-governance on small-scale regenerative farming practice will be scheduled for Spring 2025
Issues, challenges, roadblocks: Not available yet
Results, outputs, outcomes (expected or achieved): Not available yet
Risk Mitigation: Not available yet
Stakeholders involved or to be involved in this step: N/A
Additional Comments:
Are there any tools or methods the pilot is using in this step?
Timeline (expected or achieved): N/A

LKL Formalized:
Description of the step: The process started with the formation of the pilot coordination group. Pilot Coordination Group has been established consisting of RUC researchers (Jonas Egmose as PI and Anya Umantseva as post.doc lead researcher) and a representative from the association (Maria Andersen) to develop, coordinate, implement, evaluate and report on activities. Following the Future Creation Workshop organized by RUC in January 2024 that was attended by 30 farmers members of the association, a pilot plan was established by the coordination group, based on the insights of the workshop. Currently (winter 2024) we are carrying out a preparation phase for the work with the municipalities, which consists of 1) mapping out which municipalities will be included (by analyzing their climate plans and mentions of regenerative or community-supported farming in their municipal strategies); 2) drafting a work plan with municipal representatives; 3) contacting municipal representatives for initial bilateral discussions.
Issues, challenges, roadblocks:
Results, outputs, outcomes (expected or achieved): N/A
Risk Mitigation: N/A
Stakeholders involved or to be involved in this step:N/A
Additional Comments:
Are there any tools or methods the pilot is using in this step?
Timeline (expected or achieved): N/A

New Data produced:
Description of the step: We are in the process of collecting dataAn online questionnaire about Community-supported agriculture (CSA) models in Denmark, co-designed with the CSA working group is underway
Collaboration with the CSA working group on co-creation of the data collection activities on the theme of CSA models in Denmark
Issues, challenges, roadblocks: Not available yet
Results, outputs, outcomes (expected or achieved): Not available yet
Risk Mitigation: Not available yet
Stakeholders involved or to be involved in this step:N/A
Additional Comments:
Are there any tools or methods the pilot is using in this step?
Timeline (expected or achieved): N/A

Co-design workshop (exploratory co-design):N/A
Description of the step:
Issues, challenges, roadblocks:
Results, outputs, outcomes (expected or achieved):
Risk Mitigation:
Stakeholders involved or to be involved in this step: N/A
Additional Comments:
Are there any tools or methods the pilot is using in this step?
Timeline (expected or achieved): N/A

Definition of NBS Innovative solutions:N/A
Description of the step: Not available yet
Issues, challenges, roadblocks: Not available yet
Results, outputs, outcomes (expected or achieved): Not available yet
Risk Mitigation: Not available yet
Stakeholders involved or to be involved in this step: N/A
Additional Comments:
Are there any tools or methods the pilot is using in this step?
Timeline (expected or achieved): N/A

Co-design workshop (executive co-design):
Description of the step: Not available yet
Issues, challenges, roadblocks: Not available yet
Results, outputs, outcomes (expected or achieved): Not available yet
Risk Mitigation: Not available yet
Stakeholders involved or to be involved in this step: N/A
Additional Comments:
Are there any tools or methods the pilot is using in this step?
Timeline (expected or achieved): N/A

Participatory budgeting activities:
Description of the step: Not available yet
Issues, challenges, roadblocks: Not available yet
Results, outputs, outcomes (expected or achieved): Not available yet
Risk Mitigation: Not available yet
Stakeholders involved or to be involved in this step: N/A
Additional Comments:
Are there any tools or methods the pilot is using in this step?
Timeline (expected or achieved):N/A

Co-design proposals:
Description of the step: The co-design activities are organized according to the set up of the pilot/assessment case. The key objective of the LKL is to base the activities on the needs, interests and possibilities of the practitioners, hence the co-design activities are taking place closely with the different groups of practitioners in the LKL, and are continuously adjusted. The LKL consists of a 1) coordination group (RUC teams and a key person from the partner - Regenerative Farming Association.2. Working groups (Community-supported agriculture group consisting of the RUC team and Association members) 2. Farming and biodiversity group 3. Municipal actors group (will be launched in spring 2025 - consist of representatives of municipalities interested in supporting regenerative farming and integrating it into their strategies). Within these groups we regularly meet for co-creation activities, discussing knowledge needs for data collection, the collaborative activities which are relevant for the practitioners, and co-dissemination activities. We hold regular meetings within the coordination group, we had 3 meetings with the CSA group and 2 meetings with the biodiversity group.
Issues, challenges, roadblocks: 1. We have a strong focus on ensuring that the development of activities is in line with interests in the association and coordinated with activities run by the association. To ensure this, we are aiming at agreements where some of the activities are led by the association itself or working groups within the association, to ensure that the practitioners are not only participants, but also owners of the pilot.. Because of the limited resources of the association and the voluntary nature of the collaboration with the working groups, it is sometimes challenging to acquire commitment from the members to dedicate time and effort into leading the activities. It is possible that we will need to scale down the activities, and instead of forming three working groups to work on three different themes, we might propose to form only one working group from the whole Association of Regenerative Farming, which would work on the three proposed themes.

Results, outputs, outcomes (expected or achieved): 1. Report on the Future Creation workshop, produced by RUC and presented at the Association's general assembly to inform their activities
2. Development of working groups on the themes of CSA and farming practices/biodiversity to coordinate and co-implement activities
3. Co-creation and validation of the pilot plan in the Coordination Group
Risk Mitigation: Not available yet
Stakeholders involved or to be involved in this step: N/A
Additional Comments:
Are there any tools or methods the pilot is using in this step?
Timeline (expected or achieved): N/A

NBS Solutions:
Description of the step: Not available yet
Issues, challenges, roadblocks: Not available yet
Results, outputs, outcomes (expected or achieved): Not available yet
Risk Mitigation: Not available yet
Stakeholders involved or to be involved in this step: N/A
Additional Comments:
Are there any tools or methods the pilot is using in this step?
Timeline (expected or achieved): N/A

Validation process with the stakeholders:
Description of the step: Not available yet
Issues, challenges, roadblocks: Not available yet
Results, outputs, outcomes (expected or achieved): Not available yet
Risk Mitigation: Not available yet
Stakeholders involved or to be involved in this step:N/A
Additional Comments:
Are there any tools or methods the pilot is using in this step?
Timeline (expected or achieved): N/A

Action Plan:
Description of the step: Not available yet
Issues, challenges, roadblocks: Not available yet
Results, outputs, outcomes (expected or achieved): Not available yet
Risk Mitigation: Not available yet
Stakeholders involved or to be involved in this step: N/A
Additional Comments:
Are there any tools or methods the pilot is using in this step?
Timeline (expected or achieved): N/A

Finalized solution ready to be implemented:
Description of the step: Not available yet
Issues, challenges, roadblocks: Not available yet
Results, outputs, outcomes (expected or achieved): Not available yet
Risk Mitigation: Not available yet
Stakeholders involved or to be involved in this step:N/A
Additional Comments:
Are there any tools or methods the pilot is using in this step?
Timeline (expected or achieved): N/A

Implementation:
Description of the step: Not available yet
Issues, challenges, roadblocks: Not available yet
Results, outputs, outcomes (expected or achieved): Not available yet
Risk Mitigation: Not available yet
Stakeholders involved or to be involved in this step: N/A

Additional Comments:
Are there any tools or methods the pilot is using in this step?
Timeline (expected or achieved): N/A

Roadmap Workflow

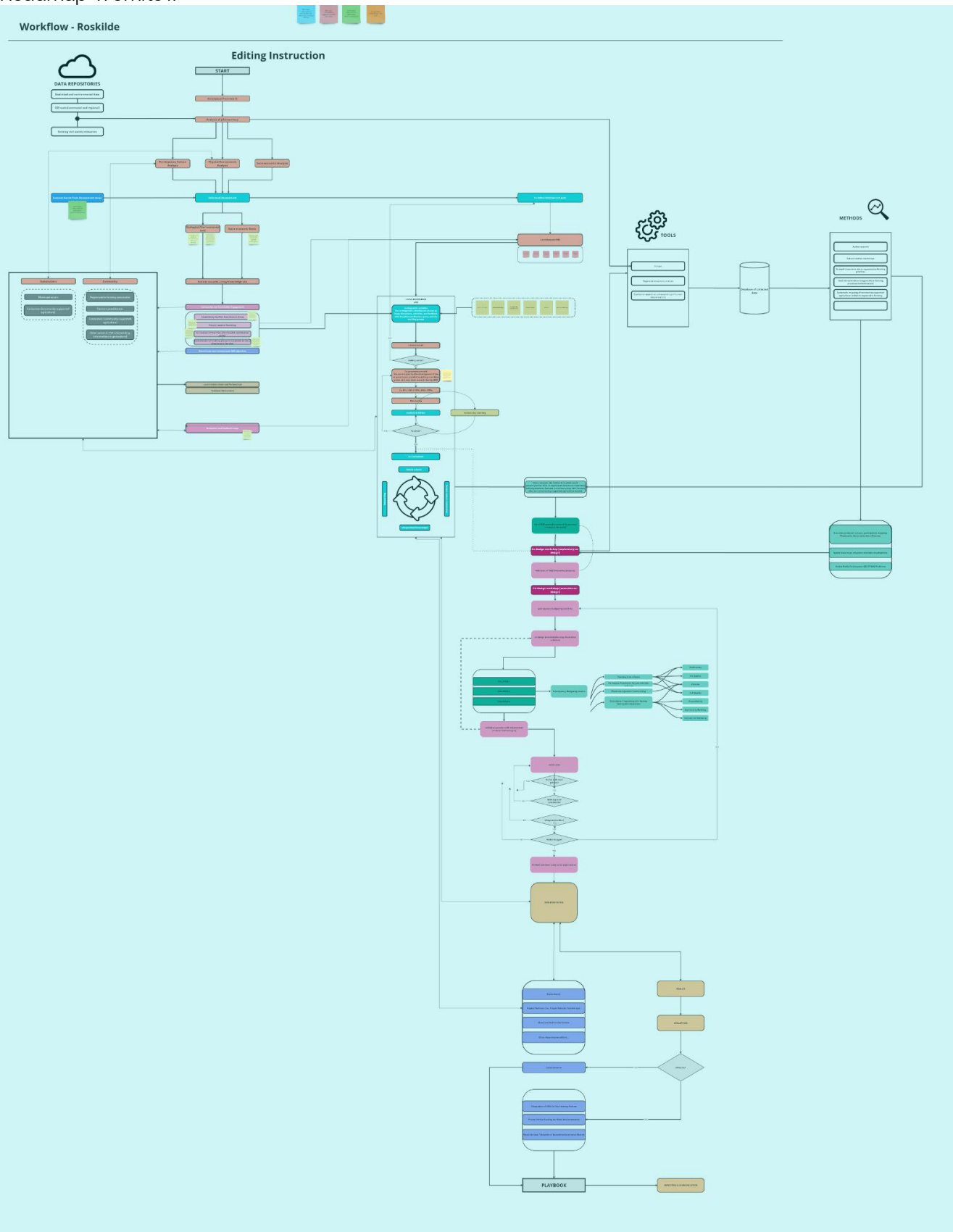


Figure 9: Roadmap Workflow for Roskilde Pilot (Author A. Umantseva)

Gantt chart of the Implementation Plan

	2024									2025												2026									
	04	05	06	07	08	09	10	11	12	01	02	03	04	05	06	07	08	09	10	11	12	01	02	03	04	05	06	07	08	09	10
Phase 1: Mapping phase identification of challenges, visions and action points for pilot plan co-creation																															
Phase 2: Organizational setup and anchoring with the association, and two (or three) working groups, and setup of working-group for municipal governance.																															
Phase 3: Action research and knowledge co-creation on human-nature relations and socio-economic organization of small-scale regenerative farming and lifestyles.																															
Phase 4: Establishing (virtual) **farmer to farmer knowledge exchange** networks and seminars (This phase is still to be confirmed, it might be taken out of the plan)																															
Phase 5: Co-creating and maturing models for **cross-municipal collaborative governance** on regenerative farming.																															

Table 10: Gantt Chart for Roskilde Implementation Plan (Author: A. Umantseva)

Annex 7: Azores Implementation Plan

Brief description of the pilot:
The Pilot is based on Lagoa Municipality territory at São Miguel Island (Azores- Portugal) and our objective is to create a Nature Base Solution based on "Lagoa water Trail (hell window)", that is part of "Trilhos dos Açores", a Network of Pedestrian Routes Classified by the Regional Government of the Azores and the trail is located in Lagoa City. A strategy to adapt the existing trail into a NBS was developed and many activities (related with science, nature connection, health, well-being, education, culture, biodiversity preservations, etc) have been developed there to collect information and test some solutions that can be implemented in the future on a regular basis.

Co-define challenges and goals:
Description of the step:
1. Validate the Water Trail value proposal. - The involved partners (UAc, Kairós, Lagoa Municipality) with local stakeholders (schools, environmental education centre, associations, NGO´s, parish Councils) developed a Value Proposal document that has been discussed and approved at a stakeholder meeting. The initial proposal was developed by involved partners in different meetings and from that result a Proposal that was presented, discussed, improved and approved at stakeholder meetings.
This proposal is based on 4 different dimensions.:

a) The trail as a forest living knowledge lab for citizen science;
b) The trail as a space for health and well-being and inclusivity;
c) The trail as a space for culture, art and identity;
d) The trail as a space for inclusive entrepreneurship based on local community, capacity building;

2. To develop activities related with experience of the trail/connecting with nature and knowing the neighbourhood community, to implement a local development initiative that can be based on the Trail as an NBS. An activity plan was developed by involved partners, departing from their experience, knowledge and strategy to research how this trail can be a future NBS. The developed activities had different target groups depending on our strategy: most of them had a focus on youth, NGO´s clients, trail users and citizens. The activities were/are developed by involved partners that use their regular budget to finance it.
3. Co-construct an annual activities planning with the activities that will be promoted on the "water trail" on a regular basis and also incorporate some extraordinary activities that will be organised to test/evaluate potentialities and difficulties to its implementation in the future.
Issues, challenges, roadblocks: we are implementing a participatory governance model for planning/running activities, on its implementation and evaluation. This process takes time because it demands a lot of flexibility to conciliate the agenda/ workload/duties that each person has as an employee in each involved institution. For that it is necessary to have a good management of regular tasks inside our organisations with our duties on TLH project and the workload running the Pilot activities and tasks. At this moment we are doing the planification of the pilot activities for the 2024/25 school calendar, and planning next research activities as part of knowing the community and the users experience of the trail.
Results, outputs, outcomes (expected or achieved): Concerning outputs/outcomes we have been successfully running different activities as:

1. In cooperation with schools - leading visits of youngsters to the trail: In the 1st semester of 2024, several schools and associations in Lagoa were involved to do the Water Trail, guided by us. We had 157 young people that participated in these activities.
2. In Cooperation with UAc /Social work Degree Coordination, an LKL, entitled Artistic Micro-residency, entitled "Body-Art-Nature and Waste", was developed during 3 days in cooperation with French artists, involving 40 students. .
3. In cooperation with EXPOLAB (Live science in summer programme), a cinema night was organised and we had around 100 persons at our Film Festival into the Forest.

4. UAc has done the installation of two eco counters to count pedestrians entering at the trail and have tools to collect and communicate the data that allow us to calculate the cargo capacity of the trail.
5. UAc team with the contributions of involved partners, develop a website to develop virtual environments interactions on Green Tourism, Citizen Science, Community building, that allows users to act as citizen scientists, and virtual tourist guides - www.trilhodomundo.org.
6. In cooperation with OVGA we have been part of European Night of Macaronesian Researchers, where we have a space that has been visited by thousands of visitors, where we have animated a circle conversation about TLH and NBS.
7. To research and develop improvements to use the trail as a therapeutic one to promote health and well being.
8. A Training on" Forest Mind Guide Training" will be organized for social work students from UAc.
9. To collect data about Remedios Community and about the risk perception of the trail users. This data collection was possible by the cooperation of a social work students class integrated in a Curricular Unit called "Social work research laboratory", as pedagogical innovation training to develop competencies entering in communities.

Risk Mitigation:

In any plan there is always the possibility of unexpected problems, especially when we are working in outdoor activities and involving a diversity of partners. To face this our plan is concentrate activities when possible, anticipate activities in face to proposed date or delay some since we have an activity plan for one year (September 2024 to August 2025)

Stakeholders involved or to be involved in this step:

There are two type of stakeholders:

a) Collaborators entities (with who we have been involved in the co-definition of challenges and goals, and are working with us to developing activities):

- Expolab (night cinema; living science; eco-schools;reciprocity);
- Schools/education entities (eco-schools/water trail as a living science space);
- OVGA (partner entity in the Lagoa, helped Schools visit to the trail and in organizing Macaronesia's Researchers' Night);
- St. Cruz Parish Council;

b) Formal stakeholders (data collection)

- Local power (Lagoa City Council);
- Sports clubs (Lagoa Nautical Club; Lagoa Preparatory School Athletics Club;
- Tourist entertainment companies (NELAG – Lagoa Business Center, Mario Pereira);
- Cultural associations (Cultural and Recreational Association of Remedies; New creative musical group or traditional singing group from Santa Cruz; Os Quiridos – Creative Association and Promoter of Cultural Events);
- Education (5 schools in the Municipality);
- Social intervention institutions (Take Risks; Cabouco Social and Cultural Center; Casa do Povo de Água de Pau; APRJ - Terra Jovem);
- Environmental organizations (CEFAL; OVGA; Eco-trails club);
- Youth associations (Lagoa Youth Association; Sound of the Wind youth group; Ribeira Chã Youth Association)

Additional Comments:

In the future we want to involve other stakeholders in the health sector due to our interest to research and work on the Water Trail as a Therapeutic Trail. The involved partners (UAc, Kairós, Lagoa Municipality) have agreed from the beginning of the project about this need, since there are a few opportunities in the azores region concerning mental health solutions, the promotion of well-being and positive lifestyles. For that we want work and connect the following organisations:

- Hospital CUF;
- ARRISCA;
- USISM Lagoa

Other important regional stakeholders to be involved will be:

- SPEA - Portuguese Society for the Study of Birds;
- Regional Directorate of Forest Resources;
- DMO - Sustainability Management Structure.

Are there any tools or methods the pilot is using in this step?
At this step we are working with community mapping, walk through, questionnaire to the community of Remédios, Teams meetings, training sessions, capacity building, study visits, research (risk perception about the trail).
Timeline (expected or achieved): September 2024 to August 2025

List of relevant NBS:
Description of the step: We are not working with standard NBS. The Water Trail / Hell's Window was approved in 2017, and opened to the general public, namely trail lovers, the local community, including schools and youth associations and their families.
The challenge/step is to research how to adapt an existing trail to a therapeutic trail. There are a lack of data/research, findings about therapeutical trails set up in existic touristic offers, as local assets. A member of the UAc team (Eduardo Marques) is a forest therapy guide with experience conducting groups of people, especially cancer patients, and has an extended bibliography on this issue and is connected with forest therapy guides all over and is doing a Forest Therapy Practitioner Certification and in 2025 he will done Forest Minde Guide Training.
References to take in consideration:
Clifford, A. (2018). Your Guide to Forest Bathing. Experience the Healing Power of Nature. Conari Press.
Li Q. (2022). Effects of forest environment (Shinrin-yoku/Forest bathing) on health promotion and disease prevention - the Establishment of "Forest Medicine". Environmental health and preventive medicine, 27, 43. https://doi.org/10.1265/ehpm.22-00160
Wang, X., Gong, X. F., Xiong, K. X., Guo, D. S., Liu, L. J., Lin, C. M., & Chang, W. Y. (2022). Mapping of Research in the Field of Forest Therapy-Related Issues: A Bibliometric Analysis for 2007-2021. Frontiers in psychology, 13, 930713. https://doi.org/10.3389/fpsyg.2022.930713
Issues, challenges, roadblocks: Our aim to develop water trail to be offered as an NBS
Results, outputs, outcomes (expected or achieved):

1. Mapping of the local culture of participation, through a questionnaire, to understand among the population the benefits and changes in the community related with Water Trail (on going process);
2. Identify the challenges we will face to adapt the trail as a Forest Therapy setting that can be offered /recommended by doctors as a place for health and well-beig using the social prescribing.
3. To continuously develop an evaluation of users Risk Perception: The winter phase is done (15 october-15 november 2024) and the summer phase will be conducted in July/august 2025.
4. **Risk Mitigation:**

Concentrate activities when possible, anticipate activities in face to proposed date or delay some since we have an activity plan for one year (September 2024 to August 2025)
Stakeholders involved or to be involved in this step:

- Hospital CUF;
- ARRISCA;
- USISM Lagoa
  Note: these stakeholders are the main health actors in azores (São Miguel Island) to work on this challenge.

Additional Comments:
As soon as possible we want to establish a partnership with - Association of Nature and Forest Therapy - https://anft.earth/ , that "Support planetary health by nurturing heart-centered relationships between all peoples and the More-Than-Human World of Nature" and other important actors on these field.
Timeline (expected or achieved):
October 2024 - May 2025

Co-diagnostic activities:
Mapping community through participatory activities: Walkthrough, interviews and questionnaires
Description of the step: Making a walkthrough in Remedios territory, Interviews with parish council president; interview community members as key assets (based on ABCD methodology);

Asset Based Community Development (ABCD) is an approach to sustainable community-driven development. Beyond the mobilisation of a particular community, it is concerned with how to link micro-assets to the macro-environment. Asset Based Community Development's premise is that communities can drive the development process themselves by identifying and mobilizing existing, but often unrecognised assets. Thereby responding to challenges and creating local social improvement and economic development.
https://www.nurturedevelopment.org/
To know more about the user experience on the trail we will apply an entry and exit questionnaire on the trail and research about users' perception about risk at the Water Trail.

Issues, challenges, roadblocks:
Time management and climate changes events (winter season) can delay the planned activities

Results, outputs, outcomes (expected or achieved):
On Remédios territory(Lagoa) we have done in October/November 2024 a walkthrough activity involving 32 youngsters, and interviewed the community (house by house). In December. More stakeholders will be interviewed and we will map natural assets with art/drawing in a collaboration with URBAN SKETCHERS AZORES.
Concerning research we have done a questionnaire for "Risk perception on pedestrian trails" to water Trail users that have been presented at the "CULTURS International Conference" that was held in Coimbra on 14-15 November 2024 organised by the CES.
https://ces.uc.pt/culturs-ic/?lang=2&id=46361

Risk Mitigation
In any plan there is always the possibility of unexpected problems, especially when we are working in outdoor activities and involving a diversity of partners. To face this our plan is concentrate activities when possible, anticipate activities in face to proposed date or delay some since we have an activity plan for one year (September 2024 to August 2025)

Stakeholders involved or to be involved in this step:
Urban Sketchers Azores - https://urbansketchers-portugal-azores.blogspot.com/
Urban Sketchers Azores is a collective of authors who draw in graphic diaries the cities where they live, the places where they travel, meet to draw from time to time

Additional Comments:
Are there any tools or methods the pilot is using in this step?
Walkthrough/ABCD
Cultural Mapping
Risk perception questionnaire

Timeline (expected or achieved):
From October 2024 to March

Co-governance model:
Our co-governance model is based on 3 important partners that work together for the success of the project. They are University of Azores, Kairos NGO and Lagoa Municipality. There are regular face to face meetings between the partners and thematic meetings to collect ideas, share responsibilities and manage budgets.

Description of the step:
To establish a closer relation between Municipality of Lagoa, parish councils of the municipality, schools and local NGO'S, young people associations, to co-design strategy for the pIlot intervention.

Issues, challenges, roadblocks: Not available yet

Results, outputs, outcomes (expected or achieved):
Walkthrough activity report;
Risk perception research presentation at an international conference;
Community mapping report;
Application of questionnaires (entrance and exit of the trail)

Risk Mitigation:
To face this our plan is concentrate activities when possible, anticipate activities in face to proposed date or delay some since we have an activity plan for one year (September 2024 to August 2025)

Stakeholders involved or to be involved in this step:
Not needed stakeholders at this phase

Additional Comments:
Are there any tools or methods the pilot is using in this step**?**
Meetings
Timeline (expected or achieved):
September 2024 to April 2025.

LKL Formalized:
The Artistic Micro Residency/Live Knowledge Laboratory, entitled "Body-Art-Nature and Waste", was developed in São Miguel Island on VAGA during 4 days.
VAGA is an association and a community space to think about arts and knowledge, attentive to the dynamics of the island and those who inhabit it. Participants were social work students at the university of azores. https://andafala.org/en/vagapdl
This LKL allows youth involved to develop a transformative practice to decolonizing knowledge, on the relations between nature, society and art, developing creativity, reflection and reciprocity on human - nature relation. The group have been guided through the "Water Trail" by a professor and Forest Guide, with the input of tree french artists that helps students to look into nature as an art work. Participants should collect waste from the "Water trail" and use it as raw material to create a collective artwork between all participants. Before the group had visited the Garbage Factory of São Miguel Island to see and feel how society abuses the exploitation of natural resources and then sent it away. During the visit, participants collect different types of garbage, to transform it into a participatory art work. The group cooperates with artists to create new language of meanings and relations with nature, linking the material world with the natural world.
Description of the step:
Learning from the experience of nature with the lens of artists. This artistic residency was led by teachers/artists from the École Supérieure d'art d'Aix-en-Provence, who came to the Azores as part of a mobility, supported by the Erasmus+ Program. In this context, we were able to work with the following resident artists: Abraham Poincheval (performance art and environment), Catherine Melin (installation, bodies and public space) and Carlos Casteleira (geo-photographer). In terms of final artistic objectives, the Artistic Micro Residency/Live Knowledge Laboratory resulted in the production of a collaborative sculpture/totem on the idea of a "Common Home", which is our planet Earth, which we urgently need to protect and defend.
Issues, challenges, roadblocks:
It was a big challenge to create a participatory work of art – "Our common home – Body-Art-Nature and Trash". Participants were invited to engage in sensorial reflection starting from landscapes, that is, the place through which we enter into relationships with other creatures, human and non-human. The work was based on the use of words, observation, movements and waste, as raw materials that helped us experience the unsustainability of our world. Global North consumes too much, pollutes too much, creating the unsustainability of the Western model of life, generating increasingly complex phenomena of poverty. Art can be a tool to give voice to citizenship and help build a decolonialized critical consciousness. According to Rotgans and Marques (2014, p.160), "As citizens, we are increasingly involved in art as an integral part of public space, which has a positive influence on different aspects of our society".
Results, outputs, outcomes (expected or achieved):
Group discussion to present individual reflection about the experience that worked as a learning community. The idea, process and result of the Artistic Micro-residency for Teaching Social Work through Art as a Living Knowledge Laboratory, was described in detail in a chapter of a Book about social work and art that was published in Portugal in november of 2024
https://m.pactor.pt/pt/catalogo/ciencias-sociais-ciencias-forenses/servico-social/servico-social-e-intervencao-pela-arte/
Risk Mitigation: No plan has been developed.
Stakeholders involved or to be involved in this step:
- École Supérieure d'art d'Aix-en-Provence - https://www.esaaix.fr/
- VAGA - https://andafala.org/Vagapdl

Are there any tools or methods the pilot is using in this step?
For this LKL different artistic methodologies/processes were used like: art povera, land art, recycling art, bioart.
Timeline (expected or achieved):

April and May 2024

New Data produced:
Data about "Risk perception" at the Water Trail
Green tourism is growing on a global scale and trails in natural settings are increasingly sought after by tourists seeking immersive experiences in natural settings. As part of the European project "TRANS-Lighthouses - More than green - Lighthouses of transformative nature-based solutions for inclusive communities", a study is underway on a hiking trail called "Trilho da Água-Janela do Inferno" with the aim of transforming this trail into a Nature-Based Solution. In this context, it is important to understand visitors' perceptions of risks and to what extent this assessment may jeopardize the experience lived on the trail and to generate knowledge about the risks of environmental degradation, given the exponential flow of tourists. This nature tourism, and in particular the experience on hiking trails, involves a series of risks, from unpredictable weather conditions to terrain hazards. The understanding of these risks by hikers directly affects their experience, preparation and behaviour along the trails, influencing not only their personal safety, but also the sustainability of the activity and the preservation of the environment. In this scenario, the perception of risk on hiking trails is a subject that has not been studied much, but it is a critical factor for the risks to be understood and managed appropriately, supporting safety plans. Risk perception involves a complex interaction between human, social and natural factors and requires a balance between safety conditions, a sense of adventure and connection with nature, communities and local culture. Based on a questionnaire developed from a literature review, the study aims to explore how visitors perceive and assess risk on this trail. The results are discussed from the perspective of their contribution to improving safety conditions and satisfaction.
Description of the step:
> Research objective: identify potential hazards and risks on the "Rota da Água" trail;
> Operationalization: Questionnaire survey of trail users;
> Presentation of an exploratory analysis
> 60 questionnaires were applied to national and international hikers
> Presenting a communication at an International Conference
> Writing an article to publish in a impact factor journal
Issues, challenges, roadblocks:
Time management;
Collect data in winter time;
Writing a abstract to be approved at an international conference;
Make a presentation at https://ces.uc.pt/culturs-ic/
Write and publish a paper
Results, outputs, outcomes:
Oral presentation at International Conference Cultures, organized by the CES Thematic Line Urban Cultures, Sociabilities and Participation, aiming to critically and pragmatically explore the concept of "creative resilience" and its applications in academic research, civil society, and public policy.
Risk Mitigation:
For publishing we are looking for different journals, to be sure that we can publish an article during 2025.
Stakeholders involved or to be involved in this step:
CLISSIS - https://clissis.ulusiada.pt
iiiUC - Institute of Interdisciplinary Research – University of Coimbra
Additional Comments:
Questionnaires in 3 languages have been developed for this situation.
Timeline (expected or achieved):
October 2024 - May - 2025

Co-design workshop (exploratory co-design):
Webinar - Decolonializing reciprocity: building pathways for ecocentric approach between human and non human world. Speaker: Emmanuelle Larocque, PhD, TSI. Professeur. Département de travail social / Université du Québec en Outaouais
Description of the step:

Preparatory meeting;
Webinar open to students and professional and invited stakeholders.
Issues, challenges, roadblocks:
To discuss a complex issue as reciprocity in human and nature relations with an input from indigenous world. How to defend nature rights and how to give a voice to nature.
Results, outputs, outcomes
To organise a webinar To celebrate the Human Rights Day that is observed annually around the world on **10 December**. We will celebrate the day with our Webinar based on nature as a human right.
Risk Mitigation:
We will have an expert on ICT with us to manage the risk of tecnologie failure.
Stakeholders involved or to be involved in this step:
Collaborators entities That are at the same time stakeholders:

- Expolab
- Schools
- OVGA
- CEFAL

Additional Comments:
No
Timeline (expected or achieved):
November and December

Definition of NBS Innovative solutions:
"Water trail" as a space of science, culture, wellbeing and social inclusion
Description of the step:
Expert Meeting/workshop to co-design NBS based on "Water trail"
Organise an Expert Meeting based on Conversation /talking circle as a strategy to create a safe, non-judgmental place where each participant has the opportunity to contribute to the discussion of difficult and/or important issues.
https://www.iirp.edu/images/pdf/Hull-2010/Hull-2010-Holl.pdf
https://settlementatwork.org/en/resources/esl-conversation-circles-toolkit
Description of the step:
Solutions will be co-design during decentralized Workshops. Two different solutions will be analysed in each LKL, a local one. Focused on the respective parish/town, and municipal one, focused on the entire territory of the council. These will also be built upon the work developed by the institutions on centralized co-diagnostic session
Issues, challenges, roadblocks:
The sharing of knowledge, outcomes and results between different LKLs will be a challenge, as they will be working on a council wide solution in separate sessions.
Results, outputs, outcomes
To create a statement/policy for NBS at the "Water Trail"
Risk Mitigation:
As a time consuming activity that needs the involvement of different stakeholders the process has an open timeline that goes from April 2025 till January 2026.
Stakeholders involved or to be involved in this step:
Our aim is to have the maximum of stakeholders representing different dimension of society
Additional Comments: Conversation Circles - Circles are a tool that facilitates talking, listening, and supporting the equity of voices so that all voices can be heard, valued, and respected.
Timeline (expected or achieved):
February to april 2025

Co-design workshop (executive co-design):
Description of the step: Not available yet
Issues, challenges, roadblocks: Not available yet
Results, outputs, outcomes (expected or achieved): Not available yet
Risk Mitigation: Not available yet
Stakeholders involved or to be involved in this step: Not available yet

Additional Comments:
Are there any tools or methods the pilot is using in this step?
Timeline (expected or achieved): Not available yet

Participatory budgeting activities:
The Lagoa Participatory Budget (Azores) is a participatory democracy process that promotes the participation of citizens in local life. At the request of the community, the implementation of the Participatory Budget in the Municipality of Lagoa follows the success of the previous Youth Participatory Budget, allowing all citizens to participate in the preparation of the municipal budget, strengthening the connection between the local authority and its citizens.
Description of the step:
Mobilising youth from Lagoa to get involved at Youth Participatory Budget;
To listen and co-design a proposal for improvements at "Water Trail;
To co-promote an Educomunicacion to raise awareness about the importance of voting.
Issues, challenges, roadblocks:
Be the most voted proposal
Results, outputs, outcomes (expected or achieved):
To see the application of the Youth Participatory Budget, applied at the "Water Trail";
Risk Mitigation:
To avoid having few votes on our proposal.
Stakeholders involved or to be involved in this step:
All possible stakeholders
Additional Comments:
No.
Are there any tools or methods the pilot is using in this step?
Timeline (expected or achieved):
April 2025 - October 2025

Co-design proposals:
THE WATER HOUSE AS A SPACE FOR COMMUNITY BUILDING AND A PLACE OF LIVING SCIENCE.
Description of the step:
Develop "Water House" as a Community House, for meetings, for exhibition, for living science and socio- environmental education programs and a base camp to work on reducing the negative impacts of the massive use of the trail by tourists, developing recovery programs to maintain nature and the diversity of the ecosystems. The water house is located at the place of Remédios near the place of the water trail.
Issues, challenges, roadblocks:
The water house is a space that belongs to the municipality. The challenge is to develop a change model that allows us to think of a new use for the space and how the space can be accessible and managed in a participatory approach.
The municipality wants to develop the water house and expects solutions and ideas that come from the TLH project.
Results, outputs, outcomes (expected or achieved):
To have an interactive micro museum, a toolkit with activities related with the trail, and a regular programme with exhibitions, talks. etc
Risk Mitigation: Not available yet
Stakeholders involved or to be involved in this step:

- Lagoa Municipality

Additional Comments:
Timeline (expected or achieved):
Till the end of the project.

NBS Solutions:
Water Trail as an ecotherapy asset, affordable for all and integrating a non discriminatory approach to include people in a disadvantaged situation to benefit from it.
The idea is to create an ecosystem of institutions that will use the trail as a tool to deal with social exclusion, promoting mental health and wellbeing and offer it as part of social support.

Description of the step:
To develop a circuit inside the "water trail" to be offered as an therapeutic asset, and co-construct activities to be held during each session.
Issues, challenges, roadblocks:
Select a group of drug addicts/homeless to offer a Forest Therapy Plan. To develop a research model to evaluate the benefits of it. We want to be sure about the benefits of this trail to social inclusion and health and wellbeing. For that we are thinking of conducting research where we will observe cortisol (stress hormone), oxytocin, dopamine ('Feel Good' hormone).
Together with an important stakeholder that works in drugs abuse and social exclusion, we will conduct a field work during 2025 with a test group and a control group the benefits of "water trail"
Results, outputs, outcomes (expected or achieved):
Listen stakeholders about our idea/solution;
To create two groups (test and control group) of disadvantaged people, to get involved in the project, and participate in 4 sessions of forest therapy,
To deliver in an official laboratory the bio indicators to be analysed,
To collect data, analyse and write a paper about the experience;
Risk Mitigation: Not available yet
Stakeholders involved or to be involved in this step:

- Arrisca - https://arrisca.pt
- CUF Hospital
- Lagoa Health Center

Additional Comments:
Are there any tools or methods the pilot is using in this step?
Bio indicators tests
Poms scale
Timeline (expected or achieved):
August -December 2025

Validation process with the stakeholders:
The process of validation is not started. Just an exploratory meeting was done in 2024 with Arrisca.
Description of the step:
To develop the research protocol
To organize the groups
To conduct forest therapy walks at the trail
To evaluate /debriefing of the walks
To share results with stakeholders
Issues, challenges, roadblocks: Not available yet
Results, outputs, outcomes (expected or achieved): Not available yet
Risk Mitigation: Not available yet
Stakeholders involved or to be involved in this step: N/A

- Arrisca - https://arrisca.pt
- CUF Hospital
- Lagoa Health Center
-

Additional Comments:
Are there any tools or methods the pilot is using in this step?
Forest Mind Method
https://metsamieli.fi/Forestmind-fi/

Timeline (expected or achieved):
February 2025

Action Plan:
Description of the step:
Training in Forest Mind Method;
Forest Mind Walk
Exercices simulation;

Conduct groups to the water trail for Forest Mind activities
Evaluation
Issues, challenges, roadblocks: To organize small groups of people interested in forest mind walks. It will be a challenge to provide free transportation to the groups. The municipality will be involved to provide free transport to go to the trail and from the trail to the city (Lagoa).
Results, outputs, outcomes (expected or achieved): Evaluate the results of the Forest Mind Walk with POMS that measure six different dimensions of mood swings over a period of time. These include: Tension or Anxiety, Anger or Hostility, Vigor or Activity, Fatigue or Inertia, Depression or Dejection, Confusion or Bewilderment. A five-point scale ranging from "not at all" to "extremely" is administered by experimenters to patients to assess their mood states.
Risk Mitigation: To involve other partners and UAc to provide transport.
Stakeholders involved or to be involved in this step: All stakeholders with vans
Additional Comments:
Are there any tools or methods the pilot is using in this step?
POMS Scale. POMS is a psychometric instrument that measures the mood states of tension, depression, anger, vigor, fatigue, and confusion.

Timeline (expected or achieved):
March, April, 2025

Finalized solution ready to be implemented:
After the experimental phase (march/april), a report (june/july) it will be done and we will be ready to implement it in august.
Description of the step: Not available yet
Issues, challenges, roadblocks: Not available yet
Results, outputs, outcomes (expected or achieved): Not available yet
Risk Mitigation: Not available yet
Stakeholders involved or to be involved in this step: N/A
Additional Comments:
Are there any tools or methods the pilot is using in this step?
Timeline (expected or achieved):

Implementation
Description of the step: Not available yet
Issues, challenges, roadblocks: Not available yet
Results, outputs, outcomes (expected or achieved): Not available yet
Risk Mitigation: Not available yet
Stakeholders involved or to be involved in this step: N/A
Additional Comments:
Are there any tools or methods the pilot is using in this step?
Timeline (expected or achieved): N/A

Roadmap Workflow

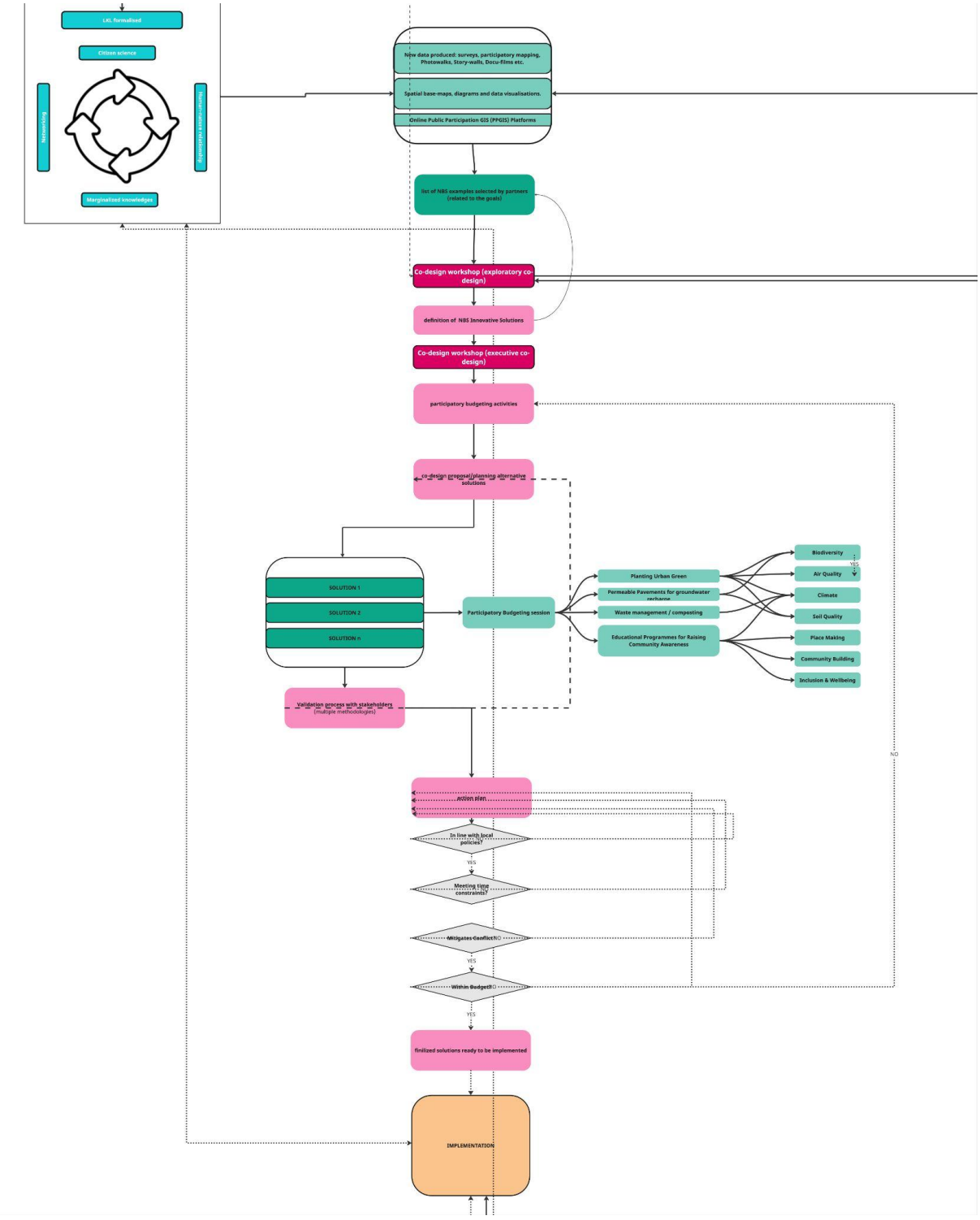


Figure 10: Roadmap Workflow for Azores Pilot (Authors: P. Silva, E. Marques)

Gantt chart of the Implementation Plan

	2024									2025												2026									
	04	05	06	07	08	09	10	11	12	01	02	03	04	05	06	07	08	09	10	11	12	01	02	03	04	05	06	07	08	09	10
Co-define challenges and goals	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■														
Co-diagnostic Activities							■	■	■	■	■	■	■	■	■	■	■	■													
List of relevant NBS																■	■	■													
LKL Formalized			■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■													
Co-Governance Model							■	■	■	■	■	■																			
Co-design workshop							■	■		■	■	■	■	■	■	■	■	■	■	■											
Co-design Proposal									■	■	■	■	■	■	■	■	■	■	■	■	■										
NBS Solutions	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Action Plan												■	■	■	■	■	■	■	■	■				■	■	■	■				
implementation												■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■

Table 11: Gantt Chart for Azores Implementation Plan. (Author: P. Silva, E. Marques)

Annex 8: Cáceres Implementation Plan

Brief description of the pilot: The rural-urban pilot project 'Mater Composta' has been designed with the intention of creating a bio-territorial feedback system or interaction and learning mechanism. This system is based on the idea of a constant relationship between human beings and the natural or biological environment of the territory they inhabit. The aim of 'Mater Composta' is to implement a pilot decentralised municipal bio-waste composting system in the province of Cáceres and, subsequently, a global decentralised system in the region of Extremadura, in order to explore more natural and community-based solutions.
The decentralized solutions tried to implement through: assessment and reports to public administrations, and training different profiles (vulnerable or practitioners and territorial leaders) as mentioned and quantified before.
To achieve this goal, we would like to suggest the design, testing and implementation of:
1_ 'Organic Change Agent'.
A series of activities are proposed, such as training-internships, consultancy, workshops and conferences to empower elected officials and municipal technicians, unemployed and vulnerable people, professionals and social leaders as 'organic change agents' who can contribute to a cultural change in municipal bio-waste management that can be beneficial.
2_ 'Menu Mater Composta'.
A participatory methodology for the co-diagnosis and co-design of an optimal municipal system of decentralised bio-waste composting. As a methodology encourages and facilitates the participation and decision-making (citizens choose a 'Menu of solutions' (from conventional to NbS, from own to high tech), and as a tool for a more global and social and less technical co-diagnosis and co-design of the natural base solution .
3_ 'Compost tasting'
An engagement and participatory workshop to discover compost and its organoleptic qualities and agronomic values.

Co-define challenges and goals:
Description of the step: Facing the application of the European Waste Directive 2018/851 and the Spanish Law 7/2022, all European municipalities are obliged to collect and treat organic waste separately. A challenge that is being faced with three main solutions:

- Conventional solutions in order to collect, transport and centralise large composting or biogas plants.
- Decentralised NbSolutions focusing on local community and organic farming.
- Hybrid solution, whereby an agreement with conventional actors to share a part of the organic in order to be community-based solved.

The co-definition of the target are defined with three profiles of actors:

- 'Eco' profile, people with sensitivity to ecological transition or territorial permaculture aligned with solution B.
- 'Conventional' actors, in order to focus on a partially decentralised and more natural and community inclusive solution, but confrontation has often occurred with conventional actors in different composting proto-living labs experiences during 2023-2024.
- 'Conventional neighbourhood', only if the local administration agrees, it became possible and convenient to convene the local population in a participatory process focusing on decentralised and more natural and community-based solutions to the organic waste challenge.

To achieve this goal, we design, test and implement the following tools as described above:
1_ 'Organic Change Agent'
2_ 'Menu Mater Composta'
3_ 'Compost tasting'

Figure 11: Poster of 'Organic Change Agent' training and practices to empower different stakeholders to contribute to a cultural change in municipal bio-waste management. (Author: Economías BioRegionales association/F.Llobera and M.Cuende, graphic design Roger Ruppmann).

MENÚ MATER COMPOSTA

Ejercicios para explorar de modo participativo las opciones de gestión de los biorresiduos municipales

Versión Mayo 2024

Menú MATER I se compone de tres pasos:
> Paso 1: cuestionario de introducción a consulta vecinal (paso 1)
> Paso 2: planificación participada (paso 2)
> Paso 3: prediseño de composteras (paso 3).

'Menú Mater Composta' está dirigido a participación ciudadana, con asociaciones vecinales, AMPAs y otros colectivos o vecindario en general para explicar y tantear sobre **las grandes modalidades de gestión de la fracción orgánica de los residuos municipales, tanto de recogida** (puerta a puerta, contenedor comunitario de recogida, por un agricultor...), **como de su tratamiento** (compostaje doméstico, compostaje comunitario, agrocompostaje..), también se puede usar como herramienta de diagnóstico y prediseño desde el personal técnico/ maestría compostadora.

Nota: por número de hogares dividir población entre 1'8 (muy envejecido) y 2'8 hab (muchos niños)

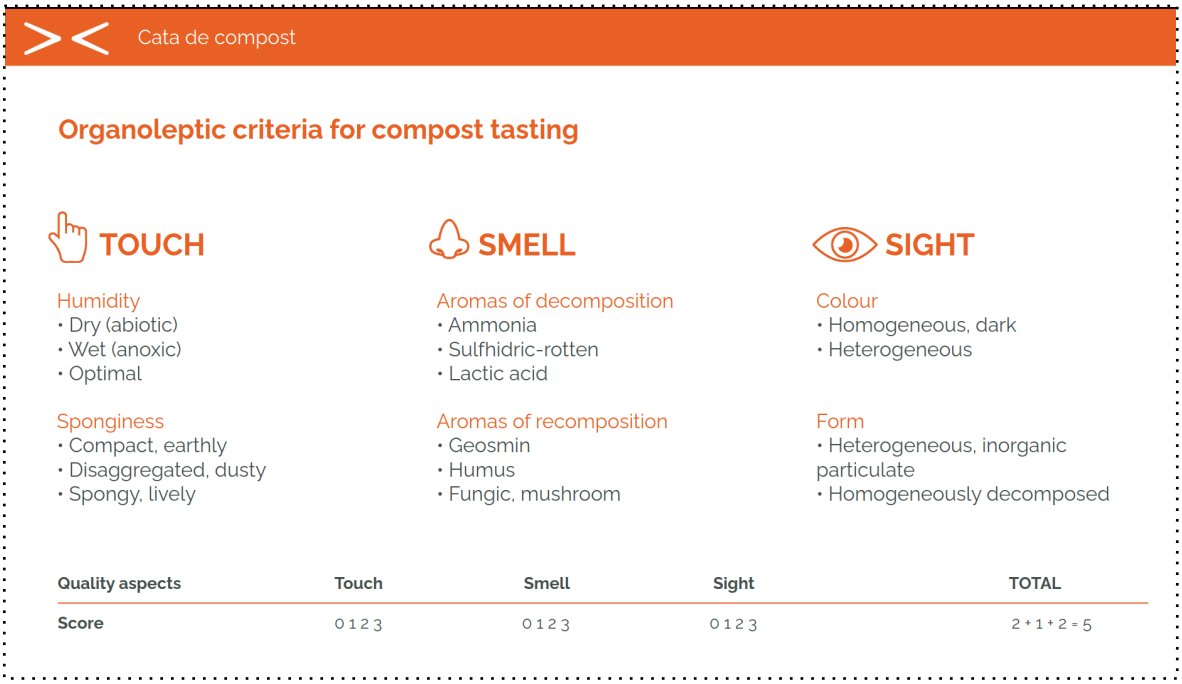
Localidad/Mancomunidad de ejercicio: N.º Hogares:
Población/ Habitantes:

Financiado por la Unión Europea

TRANS lighthouses

eBR economías BioRegionales

Figure 12: 'Menu Mater Composta' is a participatory methodology and tool for the co-diagnosis and co-design of decentralised municipal biowaste management systems. (Author: Economías BioRegionale association/F. Llobera)



Cata de compost

Organoleptic criteria for compost tasting

TOUCH

Humidity
- Dry (abiotic)
- Wet (anoxic)
- Optimal

Sponginess
- Compact, earthly
- Disaggregated, dusty
- Spongy, lively

SMELL

Aromas of decomposition
- Ammonia
- Sulfhidric-rotten
- Lactic acid

Aromas of recomposition
- Geosmin
- Humus
- Fungic, mushroom

SIGHT

Colour
- Homogeneous, dark
- Heterogeneous

Form
- Heterogeneous, inorganic particulate
- Homogeneously decomposed

Quality aspects	Touch	Smell	Sight	TOTAL
Score	0 1 2 3	0 1 2 3	0 1 2 3	2 + 1 + 2 = 5

Figure 13: 'Compost tasting workshop'. (Author: Economías BioRegionales association/F. Llobera and M.Cuende)

Issues, challenges, roadblocks:

- The slow implementation of the waste law and the new bio-waste management rules.

- The inertia of centralised municipal bio-waste management, which hinders decentralisation and more natural solutions.
- The vested interests of conventional waste management companies.

Overall: the ability of conventional actors to impose centralised solutions that are more economically and environmentally costly, and not based on more natural and community-based solutions.

Note: Why do we talk about 'more nature-based solutions' and not just 'nature-based solutions'? Because the European Directive 851/2018 and the Spanish Law 7/2022 establish the mandatory separate collection of organic waste for aerobic (compost) or anaerobic (biodigestion) treatment. And the pilot approach and proposal focuses on more decentralised treatment, with less transport, less large-scale treatment plants and less energy investment, and instead more community responsibilities and more 'decentralised natural solutions'.

During the first reporting period, 15 trips have been made to the Caceres province to monitor and promote the different composting proto-laboratories.

Results, outputs, outcomes (expected or achieved): The main results and outputs are:

1) Adjustment of the 'Menu Mater Composta' methodology and tool, developed by the association Economias BioRegionales (EBR) in compost proto-living labs of Arroyo de la Luz, Albalá, Botija, Jarandilla de la Vera y las Mancomunidades (Joint Municipal Authorities) de Sierra de Montánchez y de Tentudía.

2) Meetings and workshops within 24 (January-November 2024).

3) Certificated trainings and practises:

- 'Decentralised composting design systems' (50-150 hours) with 30 practitioners that run the composting proto-living labs (with the collaboration of MásMedio (environmental, water and waste consortium of the municipalities of the province of Cáceres) and Spanish Ministry for Ecological Transition and the Demographic Challenge (MITECO), September-December 2024).
- 'Master Composter' with vulnerable collectives in Caceres province like 18 migrant people (with Educatierra association, April-May 2024), homeless people (with CentroVida Cäceres de Cáritas Diocesanas, April-October 2024), and 15 unemployed people (with Jarandilla de la Vera municipality employment programme, July-November 2024). All of them have received individual support and mentoring.
- 'Organic Change Agent' (ACO) with 25 partitioners half women and man (some unemployed), October-December 2024,

Figure 14: Training and practices of 'Mater Composter' with the unemployed population in the composting proto-living lab in Carcaboso municipality, in collaboration with Educatierra -association for the rural reception of migrants-. (Author: Economías BioRegionales association/M.Cuende)

CERTIFICADO DE PARTICIPACIÓN

NAME SURNAME

con NIE ha participado en la formación de **Iniciación a la maestría en compostaje** de 25 horas de duración, durante los meses de marzo a junio de 2024.

Financiado por la Unión Europea

TRANS lighthouses

eBR economías biorregionales

ITINERARIO FORMATIVO

INICIACIÓN A LA MAESTRÍA EN COMPOSTAJE

1° Introducción al tratamiento de la materia orgánica y a la maestría compostadora. Una mirada municipal y agraria basada en soluciones de la naturaleza (NbS).

2° Menú MATER: diseño de sistemas de gestión de residuos orgánicos.

3° Proceso, manejo, seguimiento y monitorización de composteras.

4° Prevención de riesgos laborales: higienización del compost, manejo de herramientas (aireador, termómetro y horquilla) y EPIs (guantes).

5° Evaluación final de conocimientos adquiridos.

Esta formación de Introducción a la maestría en compostaje equivaldría al primer nivel de competencias definidos en las familias profesionales, en este caso el de Referente loca en compostaje (RLC) quien se encargará, básicamente, de realizar labores de volteo, riego y cribado, así como aporte de estructurante y mantenimiento de las herramientas del compostaje. Será responsable de identificar las incidencias básicas más comunes del proceso de compostaje y resolver y/o comunicarlas al Operario/a Compostador responsable.

Figure 15, 16, 17: Certificates of training given to the participants of the composting proto-living lab in Carcaboso municipality, in collaboration with Educatierra. (Author: Educatierra and Economias BioRegionales associations).

Risk Mitigation: To implement conventional solutions for the organic collection, transportation and centralized treatment of municipal bio-waste, clearly different from the more nature-based solutions that we understand as decentralized composting, with low technological intensity, and a high presence and participation of community capital.
Stakeholders involved or to be involved in this step: The main partners are MásMedio, for which a study of decentralization scenarios has been carried out with funds from MITECO. Different waste municipal associations, especially La Vera (Caceres province) and the Joint Municipal Authorities of Tentudia (Badajoz province) and Sierra de Montánchez (Caceres province).
Also different local municipalities with which has been tried community composting solutions (most of the composting proto-living labs): Plasenzuela municipality, Caceres Municipality, Pinofranqueado municipality, Arroyo de la Luz Municipality, Jarandilla de la Vera municipality, madrigal de la vera Municipality.
It is also remarkable the collaborations and implication on training people beneficiaries of social vulnerable associations as Cáritas Diocesana of Caceres, Educatierra migrant support association and provincial jail of Caceres.
Farmers have not been interested until this moment, but are a collective expected to work within 2025.
Additional Comments: no
Are there any tools or methods the pilot is using in this step? Interviews and mapping actors with eventual stakeholders, workshops with vulnerable collective, advising to municipalities about the law and circular economy, and some few farmers and agriculture employees (migrants) about organic fertilization.
Timeline (expected or achieved): June 2024-December 2024 with some meeting and assessment to local councils, provincial consortium, and practitioners interested in being trained and supported for initiating composting community boxes in their communities. Between January and October 2024 th 24 communities had design and or started to compost in the extremadura region assessed and supported by EBR in the TRL framework.
Three of the main "proto" are in negotiation to become agreement to consolidate their policy focused on participatory co-design and participatory budget.
November 2024-March 2025 training and practises with 20 people as 'Organic Change Agents' (OCA), started almost 5 new composting proto-living labs consisting in community composting box running in different municipalities of Extremadura Region between january and june 2025 th, and co design a proper Living Municipal Lab in La Vera and Montanchez rural areas.

List of relevant NBS:
Description of the step: In many of the current publications, compost has not been considered NbS. In the Catalogue of Nature-based Solutions for Urban Resilience. Washington, D.C. (2021 World Bank Group), can be considered implicit in the urban farming solution. But decentralized composting join as a "synergistic satisfier" (Max Neuf 1990) several NBS principles: 1) Harnessing natural processes by using the natural processing of organic matter by microorganisms to transform waste into a useful resource, such as compost, to improve soil quality and promote healthy plant development. 2) Waste reduction and nutrient cycling by managing organic waste locally, it is prevented from being sent to landfills or incinerated. This reduces greenhouse gas emissions from conventional systems. In addition, it promotes a closed nutrient cycle, returning organic matter to the soil. 3) Mitigating climate change by avoiding the generation of methane in landfills and reducing waste transport, composting in general contributes to the reduction of the carbon footprint. 4) Benefits for biodiversity since the use of compost is a sustainable way of nourishing agricultural soils and promotes biodiversity by increasing the capacity of the soil to support microbial and plant life.
Issues, challenges, roadblocks: Some of the NbS reports do not include composting. The reason is that they are prepared from a more urban planning and public works perspective. As an example in the recent World Bank report, 2021. A Catalog of Nature-based Solutions for Urban Resilience. Washington, D.C. (2021 World Bank Group), the word "waste" (linked to chemical pollution, and with no mention of organic or composting) appears only once on page 133 as part of NbS Urban Farming.
Results, outputs, outcomes (expected or achieved): no yet
Risk Mitigation: Natural based solutions need to be clarified about organic decentralized solutions.

Stakeholders involved or to be involved in this step: the NbS has been proposed from EBR and UEX partners
Additional Comments: no
Are there any tools or methods the pilot is using in this step? no
Timeline (expected or achieved): 2025

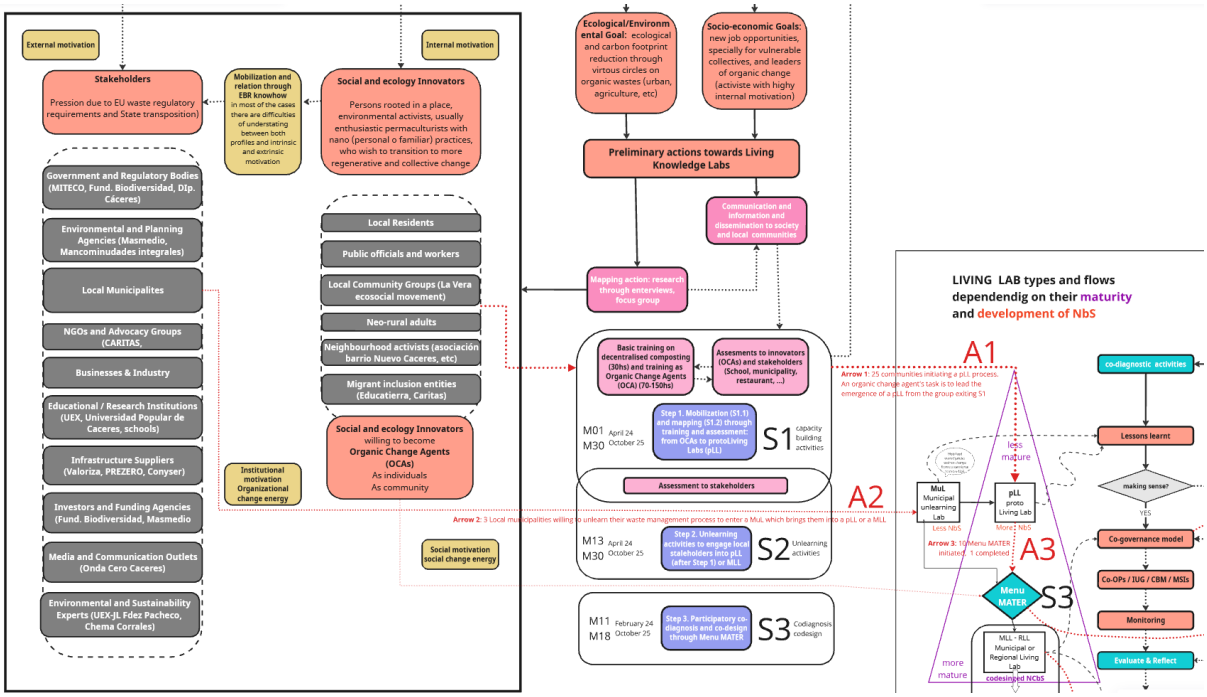


Figure 18: Roadmap Workflow for Caceres Pilot 1. (Author: B.Izaola/F. Llobera)

Co-diagnostic activities:
Description of the step:
Interviews and mapping actors with eventual stakeholders, workshops with vulnerable collective, advising to municipalities about the law and circular economy, and some few farmers and agriculture employees (migrants) about organic fertilization.
After that first interviewing and mapping approach, where the ecosystem is ready enough to go further, we use the 'Menu Mater Composta' participatory tool for co-design decentralized composting solutions. The tool has been used on a few occasions, just where the municipalities agreed to do neighborhood consultation.
In more detail, three main ways of co-diagnosis, 1) relationship with leaders/agents of organic change to whom training, advice, supply with composting equipment, and the support offered from EBR association to local and provincial administrations with competence in organic waste. 2) relationship and meeting with municipal councils with interest in composting. In the third way the main tool of co-diagnosis is 'Menu Mater Composta'. This tool has been carried out in different training contexts, but with municipalities only authorization has been obtained with: Jarandilla de la Vera (June-July 2024) and Mancomunidad de Tentudía (April-May 2024), in both cases only with municipal workers as a training exercise. With the Botija City Council (May-June 2024) with the presence of the elected representative (mayor), technicians and neighbours, it is the most complete of those carried out, and has led to the municipalidad practice of collection and local treatment in community composting areas of municipal biowaste in September 2024.
Issues, challenges, roadblocks: In order to carry out participatory co-diagnostics with a governance projection, it is necessary to count on local entities, and these are rarely willing to carry out a process of information and participation in solutions (based on nature) because they clash with the political culture in general, and waste management in particular.
Results, outputs, outcomes (expected or achieved):

'Menu Mater Composta' is a co-design tool for a more decentralized organic composting, according to more natural and more community based solutions. It has three steps. Only the first is needed in this moment of the co design. The result of these participatory methodology established the number of households in a given location that are using and will foreseeably and reasonably use the following solutions for the management of organic matter:

- Traditional uses (animal feed like pigs, hens and chicken), and prevention in the generation of biowaste through traditional animal feeding (pigs, chickens, etc.) or other permaculture measures (vermiculture, etc.). In the participatory co design the participant
- Domestic composting, which in ministerial order 02/13/2023 implies a municipal public policy of providing composting bins, structuring material, and monitoring by a person qualified for this.
- Community composting, which in ministerial order 02/13/2023 implies a municipal public policy of installing composting bins in public parks, structuring material, and monitoring by a person qualified for this.
- Door-to-door collection of biowaste, both large generators (kitchens, dining rooms) and homes. How many households do you think would be willing to participate?
- Collected in a fifth brown container on the street. It can be open or locked, mandatory or voluntary. These options are those that are decided in the participatory process, establishing the current number and the expected number of households in 2027.
- In the participating proposal, participants are offered to consider the number of households that they consider will not want to participate in any type of selective collection, and will continue as before, pouring into the "remains" fraction.

The result of the 'Menu Mater Composta' is a proposal of modalities for a management that is as decentralized as possible, taking into account the economic costs and environmental advantages of the different six measures (from 0 to V). This methodology, as main codesign tool, have been carried out in training processes (of employees or elected officials) in the composting proto-living labs of the Mancomunidades de Tentudía and Sierra de Montánchez (Joint Municipal Authority), the municipality of Jarandilla de La Vera, and the association Educatierra in the municipality of Carcaboso. It has been possible to carry out a co-design dynamic of 'Menu Mater Composta' session with neighbours (in two sessions) only with the Municipality of Botija in June-July 2024th.

Risk Mitigation: Maintain an on-demand advice service to JMA and Municipalities and other actors, from EBR association as a service in the frame of the project, until the end of the project in October 2026, so that at any time they can count on support to reorient themselves to more and better solutions based on nature and the community.

Stakeholders involved or to be involved in this step: As explained in the 'Menu Mater Composta', this tool is designed to be subjected to a citizen participation process, with a sample of different groups or representatives to have the broadest possible vision. In any case, whether or not to make the invitation to participate, and who to invite is subject to the consideration of the municipality, which will be the main partner entity to try to negotiate a stable participatory process over time.

Additional Comments: no

Are there any tools or methods the pilot is using in this step? The 'Menu Mater Composta' methodology described before.

Timeline (expected or achieved): Expected to have some new diagnosis between December 2024-June 2025, through the 'Menu Mater Composta' tool.

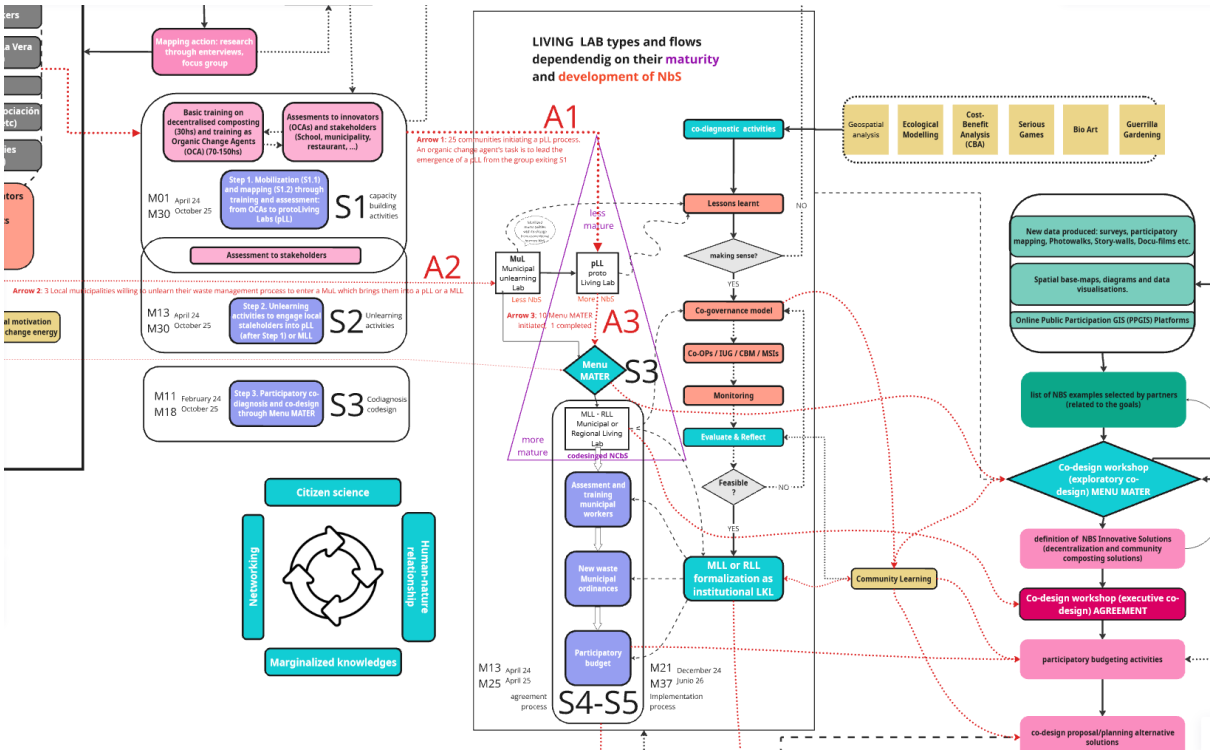


Figure 19: Roadmap Workflow for Caceres Pilot 2 (Author: B.Izaola/F. Llobera)

Co-governance model:

Description of the step: Until November 24 th the process of the pilot case Caceres province has been:

- Training, advice, practices and delivery of a composting kit (box, aerator and thermometer), for the activation of professionals in composting proto-laboratories living with a composting kit in the region of Extremadura, mainly in the municipalities of the province of Cáceres.
- Contact and offer advisoring, training and accompaniment to municipal entities and teams about the possibility of co-designing organic solutions for the mandatory biowaste separative fraction.

In between the project stakeholders have been writing an agreement model for municipalities. In November only has been started the agreement with the Mancomunidad Sierra de Montánchez (Joint Municipal Authority) in order to create a Living Knowledge Lab with the mayor, municipal technicians and neighborhood of 7 small municipalities (Albalá, Botija, Casas de Don Antonio, Salvatierra, Botija, Ruanes, Torrequemada, Valdemorales and Zarza).

The objective of co governance in the Caceres pilot case is to carry out: a co-design process (Menu Mater Composta) + implementation of a pilot collection and decentralised treatment system + draft a waste ordinance in accordance with Law 7 2022, and specific contents about a) decentralisation of organic management and b) citizen participation + participatory budget experience. The uncertainty is still knowing in which municipalities the conditions will be met to apply the maximum number of these conditions.

Issues, challenges, roadblocks: The main difficulties in starting a process of nature- and community-based solutions for biowaste management are two: Municipalities are not accustomed to decentralising waste, and neither participating in decision-making processes. Collaboration with a local entity implies an even greater difficulty in being able to advance in co-governance systems.

Results, outputs, outcomes (expected or achieved): The main results are the workshop with the Joint Municipal Authority (JMA), and the follow two 'Menu Mater Composta' sessions in Botija with a municipal team (3 people) and neighbourhood (15 people) carried out in May and June 2024, and the start of the collection process implementation between July-September 2024. The results of

the process are the advances in unlearning, training, advice and others "on going" in 10 of the other proto-living labs.
Risk Mitigation: Maintain an on-demand advice service to JMA and Municipalities and other actors, from EBR as project pilot service, until October 2026, so that at any time they can count on support to reorient themselves to more and better solutions based on nature and the community.
Stakeholders involved or to be involved in this step: The JMA and local municipalities described before, and new that will come in the next month agreement process.
Additional Comments: no
Are there any tools or methods the pilot is using in this step? 'Menu Mater Composta' is a tool for advance through the participation process in a proposal to be included in the action plan of the municipalities concerning biowaste management.
Timeline (expected or achieved): March-April 2025, expected to have a co governance agreement.

LKL Formalised:
Description of the step: The agreement is signed by Mancomunidad de Sierra de Montánchez and expected to be signed by the MásMedio, for the pilot in Mancomunidad de La Vera. Refused to be signed by caceres municipality in May 2024. An addenda with the detail of the co designed and participatory budget process and LKL will be added in march april 2025 after the first agreement for co design. Two agreements have been written and negotiated. A draft agreement with Mancomunidad de Sierra de Montanchez and a draft agreement with MásMedio Consortium to implement in the region of La Vera.
Considering the reality mapped and discussed with public actors in Caceres and Extremadura, and the political and cultural difficulty of moving forward with participatory approaches, it has been considered to establish a knowledge community, as a regional living knowledge lab (RLKL), with individuals. Online meetings have been held at least monthly between January and September 2024, and open and recorded sessions are being scheduled until at least June 2024. Participants have been considered and encouraged to move forward with the establishment of an association based on this regional knowledge community. This regional knowledge lab is focused not only in learning and exchange between practitioners but also to impact the regional government and decision making over decentralized composting.
Some pre-agreements, pilot experiences of community composting or composting proto-living labs have been signed between students of the course and local test entities with the transfer of composting bins from the project. They will not be considered agreements as they are temporary and involve community composting practices. The agreement will imply a longer commitment period.
In 2024 there has been a phase that we will call pre-agreements, pilot experiences of community composting have been signed between students of the course and local test entities, for a few months, which we have called proto living labs. Those pre-agreement has been signed in 2024 (between february and june 2024 th) with the localities of: Madrigal de La Vera, Plasenzuela de Montánchez, Pinofranquedado, Torremayor, Arroyo de la luz, who enjoyed composting equipment provided by EBR within the framework of the Translight houses. Two of them have passed, thanks to experience, agreements with the Commonwealth in La Vera and Montánchez.
Note: Regional Living Knowledge Lab (RLKL) is more related to the bioregional and not institutionalized/formalized; it is a knowledge community among the OCAs., and a Municipal Living Knowledge Lab (MLKL) is institutionalized through waste ordinances such as a municipal waste council, involving local residents, municipal staff, and elected officials.

Figure 20 : Signing of an internship agreement to transfer the composting boxes of the TRANS-Lighthouses, between the City Council of Madrigal de la Vera and David Garcia, one of the master composting training participants, in February 2024. (Author: association Economías Bioregionales/A.Morilla)

Figure 21: Dissemination poster informing of the participation in the composing proto-living lab in Madrigal de La Vera municipality held by the practitioner David Garcia,. (Author: association Economías Bioregionales/A.Morilla).

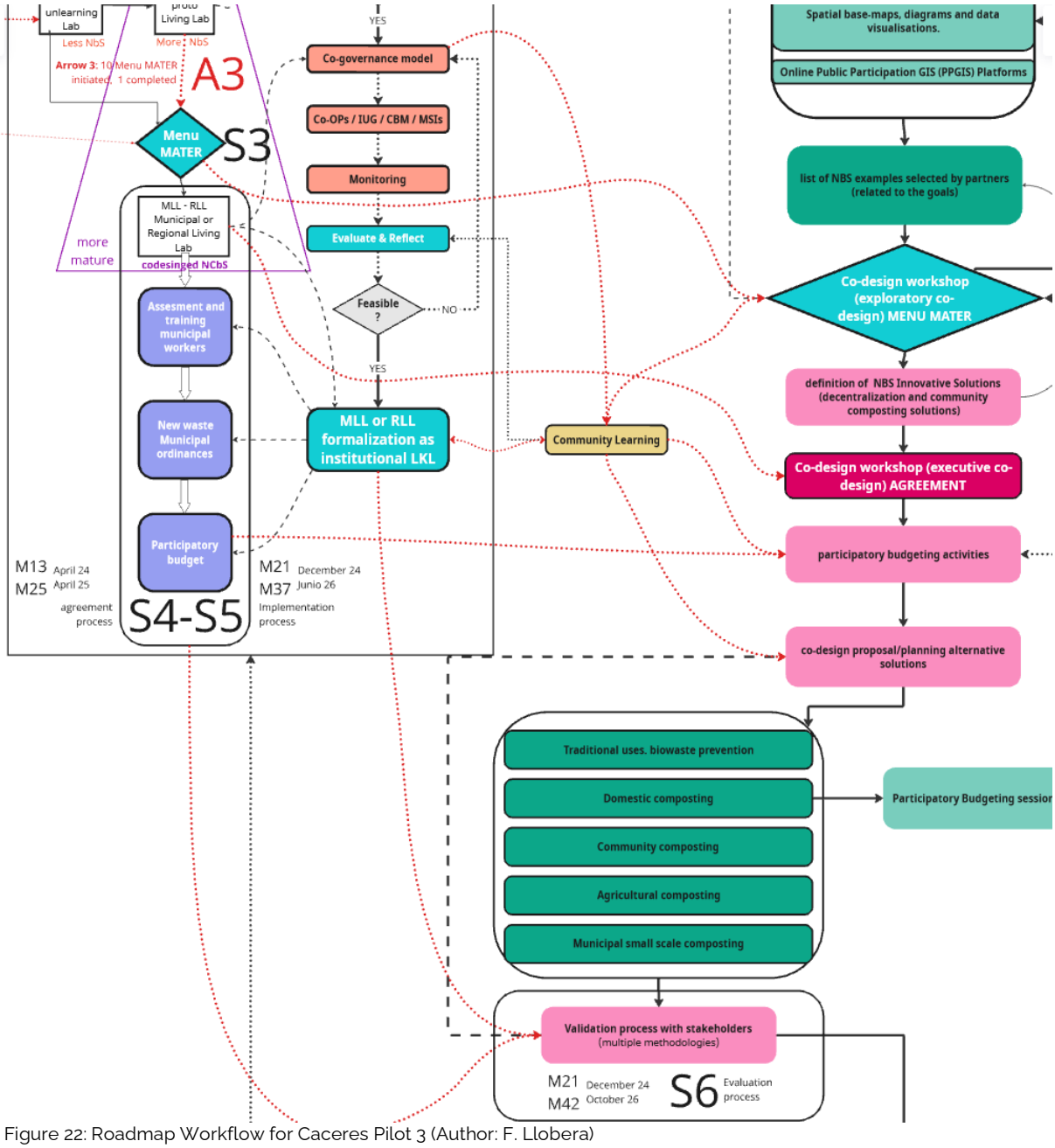


Figure 22: Roadmap Workflow for Caceres Pilot 3 (Author: F. Llobera)

Issues, challenges, roadblocks:
These five four-month experiences had several workshops open to citizens, and biowaste was contributed from different homes and restaurants and/or dining rooms
The eventual formalisation of the rLKL requires securing resources. The project has a budget but the priority is that if there is not enough co-governance and agreement content with municipalities, but we have considered as a plan B, the possibility of focusing the participatory budget on providing a civil-based regional structure with larger capacity for influence.
Results, outputs, outcomes (expected or achieved):
It is planned to implement LKL in the communities in which the agreements are being signed. These LKL will have the presence of elected officials from various municipalities, municipal technicians and neighborhood representatives and livestock farmers.
The regional knowledge community is a notable result of the first year of Pilot Case Caceres. This community has 75 subscribers to the channel, from all over the region (and neighbourhood region of Castilla), with different professional profiles, having held 10 online sessions recorded, and

actively participating in the state meeting of the national association Composta en Red, which takes place in Caceres and which we co-organize from TRL.
Risk Mitigation: N/A Municipal, community and provincial governments have resistance to citizen participation processes, and correspondingly, citizens in general (except ecosocial profiles) have resistance to participating and feel passive users/beneficiaries of public policies.
Stakeholders involved or to be involved in this step: These LKL will have the presence of elected officials from various municipalities, municipal technicians and neighborhood representatives and livestock farmers.
Additional Comments: These five four-month experiences can be considered as participatory co-diagnosis processes in action between the different actors involved in the localities.
Are there any tools or methods the pilot is using in this step? The addendum to the formalization of the agreement includes the sanction by the entities of the plan co-designed through the Menu Mater Composta with citizen participation
Timeline (expected or achieved): Expected to have confirmation an addenda about implementation, action plan, participatory budget in may 2025

New Data produced:
Description of the step: In accordance with the agreement process and co-designs described before, it is planned: 1) to collect data of citizen science about temperatures and insects and odour (tasting), 2) carry out studies of economic and carbon costs and the use of the solutions implemented compared with conventional solutions.
As a third data already produced the association Economías BioRegionales within the framework of a project with the MásMedio -environmental, water and waste consortium of the municipalities of the province of Cáceres- -environmental, water and waste consortium of the municipalities of the province of Cáceres- -environmental, water and waste consortium of the municipalities of the province of Cáceres- -environmental and waste consortium of the municipalities of the province of Cáceres-, a study has been carried out undertake by Spanish Ministry for Ecological Transition and the Demographic Challenge: "Design of decentralized management of municipal organic waste in the province of Cáceres. Territorial metabolism approach" in 2024, which will be presented at the 13th Composta en Red meeting in Cáceres co organised by the partners of the project EBR and UEx (October 2024).
The main data collected relate to the generation of bio-waste under municipal jurisdiction (waste from kitchens and dining rooms, and from parks and gardens), from all the municipalities in the province, organised by Collection Associations, and proposing different comparative scenarios, between conventional management, and the hyper-decentralised management scenarios that we consider to be a Nature-based and Community-based Solution. The study and data can be downloaded at the following. The study presents, in its first part, an analysis of the current management system of urban biowaste in the province of Cáceres (base scenario) in 22 management areas, quantifying the domains of generation, logistics and treatment. This approach is carried out considering territorial metabolism flows (volume generated and reused in traditional systems, types of collection vehicles, distances travelled, fuel consumed, greenhouse gas emissions produced, etc.) in 63 collection and transport routes modelled with different parameters (weekly frequency, transfer modules, trend variations, etc.) that link 310 population enclaves with the majority of final destination being towards the 6 ecoparks of the treatment network.
In the second part, two scenarios of decentralised composting in the province are modelled on the same territorial basis:
a) a so-called hyper-decentralised scenario in which all of the biowaste generated is managed in cycles of prevention, local recycling in community composters and local and agricultural composting centres.
b) A moderate decentralization scenario that reduces the local management component to 50% and the remaining flow maintains its current management system.
Both models are compared with respect to management parameters (prevented biowaste, recycling at source and local recycling), economic (diversion of management costs, additional income received by composting farmer, fertilizer savings and emission rights), agronomic (compost generated, fertilizer units produced, potentially fertilizable area) and environmental (reduction of GHG emissions and carbon capture in soil).

Issues, challenges, roadblocks: not providing information. For the topic of regional and provincial information, it has already been achieved in the study described above.
Results, outputs, outcomes (expected or achieved): municipal staff or contracted master composters who take monitoring data (temperature, insects, odors). The co-design processes will provide scenario data to compare with conventional and centralized management scenarios.
Risk Mitigation: the lack of collaboration of municipal staff, and/or the population in the co-design and or generation of monitoring data.
Stakeholders involved or to be involved in this step: municipal staff, and/or the population in the co-design and or generation of monitoring data
Additional Comments: no
Are there any tools or methods the pilot is using in this step? no
Timeline (expected or achieved): Expected to have first data process in june 2025

Co-design workshop (exploratory co-design):
Description of the step: similar to point Co-diagnostic activities.The exploratory co-design will be done through workshops with populations. At EBR we have a tool to diagnose and propose solutions for decentralised management of bio-waste in a participatory manner ('Menu Mater Composta'). It was designed as a tool for the development of workshops in 2017, and we have been using it as a training tool. With the Caceres pilot case, it is incorporated as a co-design tool for decentralised composting solutions.

Figure 23: 'Menu Mater Composta' sessions held with the mayors and citizens of Albal and Zarza de Montánchez municipalities (Author: Mancomunidad de Sierra de Montánchez).

Issues, challenges, roadblocks: the challenge of the number of people living in the town who attend the calls for Co-design workshop (exploratory co-design).
Results, outputs, outcomes (expected or achieved): 'Menu Mater Compost' workshops results, report and pictures.
Risk Mitigation: involvement of the city council, the effort of the local entity to call its neighbors
Stakeholders involved or to be involved in this step: These workshops are planned to be carried out in collaboration with the city councils, and in an open call to the citizens of the town.
Additional Comments: no
Are there any tools or methods the pilot is using in this step? a simplified version of the 'Menu Mater Composta' in which people raise their hands in interest at the different options explained and displayed.
Timeline (expected or achieved): These workshops began in April 2024, and can continue to be developed until the end of the project, as municipalities request it. The more of us we do, the

greater the implementation and final transfer impact of the decentralized composting proposal with co-design of nature-based solutions.

Definition of NBS Innovative solutions:
Description of the step: Decentralized, community-based composting in public parks and gardens, or on farms and ranches, is an innovative and synergistic solution in terms of: reduction of transport and transport and process emissions, economic costs that allow not to increase taxes, and increased biodiversity by carrying out composting in an artisanal way and applying it in urban or peri-urban agriculture.
Issues, challenges, roadblocks: It requires strategy and tactics: What is first for municipalities or citizens? If municipalities come first, it may be difficult to activate citizen participation. If we start with grassroots participatory processes, it is difficult for municipalities to feel involved. And if it is both at the same time It is difficult to synchronize their times and procedures. A favourable response of the municipalities is the main obstacle we face, because it has many other competencies and priorities. In order to implement these decentralised and nature-based composting solutions, the second is the favourable response of the citizens/neighbourhood and of farmers/ranchers is necessary. The involvement of all the actors in the local community is necessary, and it is not easy to involve.
Results, outputs, outcomes (expected or achieved): Not available yet
Risk Mitigation: Not available yet
Stakeholders involved or to be involved in this step: N/A
Additional Comments:
None
Timeline (expected or achieved): N/A

Co-design workshop (executive co-design):
Description of the step: This 'Menu Mater Composta' includes a framework for strategic legislative planning, so that it can be used by technicians and elected officials as executive monitoring and evaluation material.
Issues, challenges, roadblocks: There are still no participatory budgets. While waiting to complete the seed phases (composting proto-living lab), evaluate and define continuity with one or more Municipalities.
Results, outputs, outcomes (expected or achieved): Not available yet
Risk Mitigation: Not available yet
Stakeholders involved or to be involved in this step: N/A
Additional Comments:
None
Timeline (expected or achieved): N/A

Participatory budgeting activities:
Description of the step: There is still no defined space for participatory budgets linked to waste management. We are waiting to advance pilot experiences and evaluate collaboration with the municipalities.
Issues, challenges, roadblocks: The degree of administrative maturity of local entities does not easily correspond to the proposal to participate in budgets linked to waste management.
Results, outputs, outcomes (expected or achieved): Not available yet
Risk Mitigation: Not available yet
Stakeholders involved or to be involved in this step: N/A
Additional Comments:
None
Timeline (expected or achieved): N/A

Co-design proposals:
Description of the step: We consider the solution in the Municipality of Botija to be a co-designed proposal, which we summarize below: The Municipality of Botija, in the Comprehensive Commonwealth of Montanchez in the province of Cáceres, has started a decentralized composting system consisting of: an installation with three 1000-liter composters next to the town's recycling

center, with access to water and a shredder, and the bio-waste collected from four points with 120-liter containers has begun to be treated in September 2024. The collection is carried out with a municipal dumper, three days a week, with an estimated work dedication of 4 hours a week.
The motivation and methodology for implementing this solution has started from 1) the information from the Commonwealth of the expected cost of organic collection and transport to the plant by the company that already collects the remaining fraction, which amounts to €60/household (not counting the increase in treatment fees at Ecopark). 2) the search by the council for an alternative to avoid having to increase the current waste tax, which is set at €70/year per household, 3) the process of advising and training the local authority, and energizing and consulting the local population, through the 'Menu Mater Compost', to diagnose the situation of bio-waste in the town, and to present the possibilities of addressing the regulatory challenge by deliberating on the simplest and most economical solution.
It is expected that in the coming months other towns in the Mancomunidad and the province will begin to develop different solutions. Botija is already receiving visits from other Mancomunidades in the Region of Extremadura
Issues, challenges, roadblocks: The risks of co-design are several: 1) the lack of a culture of citizen participation on the main part of local entities, 2) the habit of professional engineering (citizens, engineering companies) making decisions on issues that "citizens do not know about, and want to have solved from the administration", "rubbish it is not my issue". A new system of relation administration-citizen is necessary, and changing it takes time and strategy. TRANS-Lighthouses is a helpful and good framework to be able to move the process forward.
Results, outputs, outcomes (expected or achieved): Not available yet
Risk Mitigation: Not available yet
Stakeholders involved or to be involved in this step: N/A
Additional Comments:
Are there any tools or methods the pilot is using in this step?
None
Timeline (expected or achieved): N/A

NBS Solutions:
Description of the step: Discussed above in "List of relevant NBS"
Issues, challenges, roadblocks: Not available yet
Results, outputs, outcomes (expected or achieved): Not available yet
Risk Mitigation: Not available yet
Stakeholders involved or to be involved in this step: N/A
Additional Comments:
Are there any tools or methods the pilot is using in this step?
None
Timeline (expected or achieved): N/A

Validation process with the stakeholders:
Description of the step: The main partners of the pilot are EBR and UEX, the Caceres city council has not responded to the agreement document sent in May 2024. During these first 18 months, work has been done with other stakeholders: MásMedio -environmental, water and waste consortium of the municipalities of the province of Cáceres-, with which we have carried out, within the framework of a project with the Spanish Ministry for Ecological Transition and the Demographic Challenge, a provincial study: "Design of decentralized management of municipal organic waste in the province of Cáceres. Territorial metabolism approach" (version September 2024) There are several third sector entities NGO and municipalities with which stable collaboration relationships have been established in terms of advice, training and implementation of pilot composting experiences, in order to establish .
Among the third sector entities NGO mainly: Educatierra association for the integration of immigrants, community composters have been installed and 15 people have been trained and certified; Cáritas Coria-Caceres Foundation, for homeless people, community composters have been installed and 4 people have been trained and certified as master composters.
Issues, challenges, roadblocks: Not available yet
Results, outputs, outcomes (expected or achieved): Not available yet

Risk Mitigation: Not available yet
Stakeholders involved or to be involved in this step: N/A
Additional Comments:
Are there any tools or methods the pilot is using in this step?
None
Timeline (expected or achieved): N/A

Action Plan:
Description of the step: An accompaniment itinerary is proposed that begins with the seed phase (proto Living Labs), that itinerary includes the possibility of incorporating municipalities from conventional solutions to a process of unlearning conventional (Living unlearning Labs). Among these, in the next semester we will select those Municipalities that meet the best conditions and governance disposition to be able to advance towards an agreement that includes a participatory budgeting process and a specific waste ordinance with citizen participation.
Issues, challenges, roadblocks: Not available yet
Results, outputs, outcomes (expected or achieved): Not available yet
Risk Mitigation: Not available yet
Stakeholders involved or to be involved in this step: N/A
Additional Comments:
Are there any tools or methods the pilot is using in this step?
Timeline (expected or achieved): N/A

Finalized solution ready to be implemented:
Description of the step: As a result of the lack of response from the municipality of Caceres to become a pilot town, the strategy is to keep open a provincial space as a network of rural Municipal Living Labs. At the moment the more advanced Local Entities are: Mancomunidad Integral de Sierra de Montánchez, Ayuntamiento de Botija, Ayuntamiento de Jarandilla de la Vera, Mancomunidad Integral de la Vera, Mancomunidad de Sierra de San Pedro, Ayuntamiento de Don Benito, between others. Only Botija is ready to start a pilot. We look forward to evaluating and considering further phases of collaboration starting in December 2024.
Issues, challenges, roadblocks: Not available yet
Results, outputs, outcomes (expected or achieved): Not available yet
Risk Mitigation: Not available yet
Stakeholders involved or to be involved in this step: N/A
Additional Comments:
Are there any tools or methods the pilot is using in this step?
None
Timeline (expected or achieved): N/A

Implementation:
Description of the step: An accompaniment itinerary is proposed that begins with the seed phase (composting proto-living labs), with the possibility of incorporating municipalities in the process of unlearning conventional solutions (Living unlearning Labs). Among these, in the next semester we will select those that meet the best conditions and governance disposition to be able to advance towards an agreement that includes a participatory budgeting process and a specific waste ordinance with citizen participation. In this third step we proposed to call the Municipal Lab (Municipal Living participatory Lab). It is important to include the word participatory in order to clarify that condition to become part of a Living Lab from Municipalities.
Issues, challenges, roadblocks: Not available yet
Results, outputs, outcomes (expected or achieved): Not available yet
Risk Mitigation: Not available yet
Stakeholders involved or to be involved in this step: N/A
Additional Comments:
Are there any tools or methods the pilot is using in this step?
None
Timeline (expected or achieved): N/A

Note: The steps on time depend on the demand from practitioners and Municipalities, so that we are in different steps with different municipalities and local entities and actors:

Step 1. Mapping and social mobilization through training and assessment: from Organic Change Agent training to composting proto-living labs.
Start in october 2023th with a dissemination parallel to mapping, and will continue until June 2025: Step 1 offers a package of training on master composting and assessment on design practices in different municipalities and communities. If a trained person starts an action plan and becomes an 'Organic Change Agent' training (OCA) offer from the Caceres pilot the equipment (composting boxes, aerator, thermometer, compost tracking and monitoring sheets (EIKO) for starting a composting community practice as proto-living lab.s. These OCA seeds will be spread all over Extremadura region for practicing and selecting the best condition for going to the following Pilot steps. Sometimes the iMenu Mater Compostai tool will be used as training and demo toll with some communities, but still without any municipal engagement.
Step 2. Municipal unlearning labs (MUL)
These are local entities, having participated in the unlearning dynamics developed with the Catholic University of Lovaine, or incorporated subsequently, requesting advice to initiate a decentralised composting process consistent with the objectives of Nature and Community Based Solutions. (NCbS)
Step 3. Participatory co-diagnosis and co-design. Start in February 2024th in Mancomunidad de Tentudia with a 'Menu Mater Composta' session, continue wherever a proto-living lab has conditions to discuss with the municipality and engage a participatory process with other local stakeholders as retailers, neighborhoods and farmers.
Step 4. Agreement process.
After the dynamic of co-diagnosis and co-design, the municipality determines the interest of advancing to a decentralised composting plan, and if the agreement is advanced.
The agreement takes place in two phases 4.1. is the pre-agreement of collaboration that for 4-6 months serves to learn and draft the scope and the Municipal Action Plan.
Step 5. Starting Municipal Action Plan
Implementation and monitoring.
Step 6. Evaluation is ongoing

Gantt chart of the Implementation Plan
Intensity of action on time: 3 high intensity, 2 medium intensity, 1 low intensity

	2024									2025											2026									
	04	05	06	07	08	09	10	11	12	01	02	03	04	05	06	07	08	09	10	11	12	01	02	03	04	05	06	07	08	09	10
STEP 1. 1 Mapping and social mobilisation through training and evaluation	3	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3												
STEP 1. 2 Practice and evaluation of trained Organic Change Agents implementing live composting proto-living labs	3	3	3	3	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3												
STEP 2. Municipal 'unlearning' Lab	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2												
STEP 3 Menu MATER COMPOSTA methodolog session with municipal elected representative and and citizens	2	2	2	2	1	1	2	2	2	2	2	2	2	1	2	2	1	2	2												
STEP 4 Composting pilot agreement process	2	2	2	2	2	2	2	2	2	2	2	2	2																		
SEPT 5 Implementation of the pilot and participatory action plan									2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3				
SEPT 6. evaluation on going									1	1	1	1	1	2	2	2	2	2	1	1	1	3	3	3	3	3	3	3	3	3	3

Table 12: Gantt Chart for Caceres province implementation plan (Author: Economías BioRegionales association/F. Llober).